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# QA RECORD

## ENGINEERING DESIGN FILE

### Evaluation of Radionuclide Inventory for Sodium Bearing Waste

By

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Project File Number 73301 EDF Page 1 of 9  
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<b>Title:</b> <u>Evaluation of Radionuclide Inventory for Sodium Bearing Waste</u>					
<b>Summary:</b> This summary briefly defines the problem or activity to be addressed in the EDF, gives a summary of the activities performed in addressing the problem and states the conclusions, recommendations, or results arrived at from this task.					
<b>Treatment options for sodium bearing wastes at the ICPP require a knowledge about the radionuclide content of the waste. Because radiochemical analyses of wastes in the ICPP Tank Farm do not identify all of the radionuclides present, it has been necessary to calculate a complete radionuclide inventory based on the radionuclides that have been measured. This EDF presents the results of the calculated radionuclide inventory for sodium bearing waste as a function of decay time.</b>					
<b>Distribution (complete package):</b> J. A. Jones (copy for EDF-CPP-97084), N. E. Russell (5 copies for EDF-FDO-006), B. J. Schrader, D. R. Wenzel					
<b>Distribution (summary package only):</b> Distribution of summary results of this calculation have been made in a letter to N. E. Russell, Wen-23-97, "Calculation of Radionuclide Inventories for Sodium Bearing Wastes," November 26, 1997.					
Author <u>D. R. Wenzel</u> <u>11/25/96</u>	Dept. <u>Radcon</u>	Reviewed <u>B. J. Schrader</u> <u>BJ Schrader</u>	Date <u>11/25/96</u>	Approved	Date
		LMITCO Review	Date	LMITCO Approval	Date

See Management Control Procedure (MCP) 6 for instructions on use of this form.

## Discussion

Sodium bearing waste (SBW) has been collected in the ICPP Tank Farm over the entire life of the CPP. Six storage tanks currently contain SBW. Both the age of the wastes in the tanks and the analysis dates differ. Furthermore, radiochemical analyses did not identify all of the radionuclides present in the tanks. The purpose of this EDF is to calculate an average concentration of all radionuclides for the combined volume of all of the tanks.

SBW is currently present in tanks WM-180, -181, -183, -184, -185 and -186 (Nenni 1995, Rebish 1994). The measured concentrations of radionuclides for each tank are summarized in Table 1.

**Table 1: Measured Activities of Radionuclides (mCi/L) in ICPP Storage Tanks**

Volume m <sup>3</sup>	WM-180 1.07E+3	WM-181 1.06E+3	WM-183 1.04E+3	WM-184 7.92E+2	WM-185 7.16E+2	WM-186 1.05E+3
Sample Date	02/93	02/93	10/93	11/88	03/94	06/89
H-3	2.83E-2	3.25E-2	2.06E-4	5.00E-2	2.00E-2	
Co-57			6.93E-1			
Co-60		1.88E-1	2.47E-1		6.95E-2	1.50E-1
Ni-63	2.63E-2	4.58E-2				
Sr-90	2.45E+1	2.90E+1	2.43E+2	2.74E+1	1.28E+2	3.53E+1
Zr-95		2.97E-2				
Tc-99	4.35E-3	4.22E-3	3.37E-2	8.65E-3	1.64E-2	7.80E-3
Ru-106		1.92E+0				6.90E-1
Sb-125		2.73E-1				2.50E-1
I-129	1.41E-5	7.57E-6	1.18E-2	1.00E-2	3.90E-2	
Cs-134	1.19E-1	1.07E+0	1.37E+0	3.50E-2	3.81E-1	1.98E+0
Cs-135	4.11E-4	3.99E-4	3.19E-3	3.23E-4	1.56E-3	5.12E-4
Cs-137	3.02E+1	2.98E+1	2.34E+2	2.37E+1	1.14E+2	3.76E+1
Ce-144		4.29E+0	2.35E+0		5.60E+0	2.19E+0
Eu-154	7.84E-4	3.82E-1	1.43E+0	4.00E-2	4.18E-1	2.60E-1
Eu-155		1.87E-1	1.69E+0			
U-234	9.64E-4	7.65E-4	8.40E-4	1.24E-3	1.28E-3	
U-235	2.54E-5	2.27E-5	2.89E-5	2.60E-5	2.70E-5	
U-236	4.59E-5	7.99E-5	2.82E-5	3.21E-5	6.09E-6	
U-238	2.45E-5	2.26E-5	3.85E-5	1.51E-5	2.44E-5	
Np-237	2.78E-3	2.41E-3	7.96E-3	4.61E-4	3.91E-3	
Pu-238	6.58E-1	5.17E-1	2.06E-1	6.59E-1	5.37E-1	
Pu-239	9.46E-2	2.08E-2	7.35E-2	8.30E-2	6.51E-2	
Pu-240	1.00E-2	7.86E-3	3.13E-3	3.42E-2	1.25E-2	
Pu-241	6.05E-1	4.75E-1	1.89E-1	6.95E-1	8.43E-1	
Pu-242	1.30E-5	1.02E-5	4.08E-6	9.95E-6	1.44E-5	
Am-241	6.27E-2	1.66E-2	6.40E-2	6.86E-2	7.88E-2	
Cm-244	4.38E-3	6.49E-4	4.38E-3			

The first step in calculations was to decay correct the activity in the different tanks to a common decay time of 11/97. This is presented in Table 2. The next step in the calculations was to calculate a weighted average for the radionuclide activities presented in Table 2. This was done by writing a FORTRAN program named TANKSUM. A listing of Program TANKSUM is presented in Attachment A. Program TANKSUM also calculates the activities of all of the radionuclides normalized to Cs-137. The output from program TANKSUM is presented in Table 3.

**Table 2: Measured Activities of Radionuclides (mCi/L) in ICPP Storage Tanks decayed to 11/1997**

Tank	WM-180	WM-181	WM-183	WM-184	WM-185	WM-186
H- 3	2.16E-02	2.49E-02	1.64E-04	3.01E-02	1.63E-02	
Co-57			1.52E-02			
Co-60		1.01E-01	1.44E-01		4.29E-02	4.96E-02
Ni-63	2.54E-02	4.43E-02		4.43E-02		
Sr-90	2.19E+01	2.59E+01	2.20E+02	2.21E+01	1.17E+02	2.89E+01
Zr-95		2.04E-10				
Tc-99	4.35E-03	4.22E-03	3.37E-02	8.65E-03	1.64E-02	7.80E-03
Ru-106		7.33E-02				2.11E-03
Sb-125		8.32E-02				3.04E-02
I-129	1.41E-05	7.57E-06	1.18E-02	1.00E-02	3.90E-02	
Cs-134	2.41E-02	2.17E-01	3.46E-01	1.70E-03	1.11E-01	1.17E-01
Cs-135	4.11E-04	3.99E-04	3.19E-03	3.23E-04	1.56E-03	5.12E-04
Cs-137	2.71E+01	2.67E+01	2.13E+02	1.93E+01	1.05E+02	3.10E+01
Ce-144		6.24E-02	6.16E-02	6.24E-02	2.13E-01	1.21E-03
Eu-154	5.35E-04	2.60E-01	1.03E+00	1.94E-02	3.11E-01	1.32E-01
Eu-155		9.63E-02	9.54E-01			9.63E-02
U-234	9.73E-04	7.72E-04	8.42E-04	1.26E-03	1.29E-03	
U-235	2.54E-05	2.27E-05	2.89E-05	2.60E-05	2.70E-05	
U-236	4.59E-05	7.99E-05	2.82E-05	3.21E-05	6.09E-06	
U-238	2.45E-05	2.26E-05	3.85E-05	1.51E-05	2.44E-05	
Np-237	2.78E-03	2.41E-03	7.96E-03	4.61E-04	3.91E-03	
Pu-238	6.34E-01	4.98E-01	1.99E-01	6.14E-01	5.22E-01	
Pu-239	9.46E-02	2.08E-02	7.35E-02	8.30E-02	6.51E-02	
Pu-240	1.00E-02	7.86E-03	3.13E-03	3.42E-02	1.25E-02	
Pu-241	4.81E-01	3.78E-01	1.55E-01	4.51E-01	7.06E-01	
Pu-242	1.30E-05	1.02E-05	4.08E-06	9.95E-06	1.44E-05	
Am-241	6.63E-02	1.97E-02	6.47E-02	7.57E-02	8.29E-02	
Cm-244	3.65E-03	5.41E-04	3.75E-03			

An assumption made at this stage of the calculations is that the radionuclide concentrations in the storage tanks are proportional to all of the fuel processed at the ICPP over the lifetime of the plant. A FORTRAN program called REDUCE97 (see Attachment B) was written to calculate the relative activity of all the fuel processed decayed to 11/1997. Three types of fuels were used in the calculations: aluminum, zirconium, and stainless steel. Radionuclide inventories as a function of decay time were calculated for these types of fuel using the ORIGEN2 computer code (RSIC 1991). The ORIGEN2 inputs and summarized outputs used as input to program REDUCE97 are presented in Attachment C. A FORTRAN program named REDUCE1 (see Attachment D) was used to extract the radionuclide data from the ORIGEN2 runs presented in Attachment C to a simple table form without page headings and radionuclides with zero inventories. The output of program REDUCE97 with data normalized to Cs-137 is presented in Attachment E

A comparison was next made between the weighted average activity for selected fission products presented in Table 3 to activities calculated using REDUCE97 as presented in Attachment E. This comparison is shown in Table 4. The shorter lived fission products Ru-106, Sb-125 and Ce-144 were not included because many of the tank analyses did not include them and the fact that their calculated activities are dominated by the age of the last fuel to be processed. Soluble nuclides such as H-3 and I-129 were not included in the comparison because they are not really representative of the activity requiring special decontamination efforts. As can be seen from the ratio in the last column of Table 4, the calculated activities for fission products using REDUCE97 is about as good as can be expected considering the large variety of wastes discharged to the storage tanks over many years of ICPP decontamination operations.

A decision was made to use the results of measured activities whenever possible. The next step undertaken in the calculations was to calculate the ratios between the calculated using REDUCE97 (see Attachment E) to the

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**Table 3: Weighted Average of Radionuclide Activities (mCi/L) in ICPP Storage Tanks**

Nuclide	mCi/L	Normalized to Cs-137
H- 3	1.821E-02	2.60E-04
Co-57	1.520E-02	2.17E-04
Co-60	8.785E-02	1.25E-03
Ni-63	3.738E-02	5.33E-04
Sr-90	7.181E+01	1.02E+00
Zr-95	2.040E-10	2.91E-12
Tc-99	1.239E-02	1.77E-04
Ru-106	3.787E-02	5.40E-04
Sb-125	5.693E-02	8.11E-04
I-129	1.029E-02	1.47E-04
Cs-134	1.430E-01	2.04E-03
Cs-135	1.063E-03	1.52E-05
Cs-137	7.015E+01	1.00E+00
Ce-144	7.158E-02	1.02E-03
Eu-154	3.010E-01	4.29E-03
Eu-155	4.131E-01	5.89E-03
U-234	9.954E-04	1.42E-05
U-235	2.591E-05	3.69E-07
U-236	4.124E-05	5.88E-07
U-238	2.558E-05	3.65E-07
Np-237	3.628E-03	5.17E-05
Pu-238	4.859E-01	6.93E-03
Pu-239	6.671E-02	9.51E-04
Pu-240	1.247E-02	1.78E-04
Pu-241	4.145E-01	5.91E-03
Pu-242	1.008E-05	1.44E-07
Am-241	5.952E-02	8.48E-04
Cm-244	2.643E-03	3.77E-05

**Table 4: Comparison of Weighted Average of Radionuclide Activities (mCi/L) in ICPP Storage Tanks to Activities Calculated using REDUCE97**

Nuclide	mCi/L	From Table 3		From Attachment D	
		normalized to Cs-137	mCi/L	normalized to Cs-137	Ratio
Sr-90	7.181E+01	1.02E+00	6.565E+01	9.43E-01	1.094
Tc-99	1.239E-02	1.77E-04	1.740E-02	2.50E-04	.712
Sb-125	5.693E-02	8.11E-04	3.181E-02	4.57E-04	1.790
Cs-134	1.430E-01	2.04E-03	1.421E-01	2.04E-03	1.006
Cs-135	1.063E-03	1.52E-05	7.234E-04	1.04E-05	1.469
Cs-137	7.015E+01	1.00E+00	6.960E+01	1.00E+00	1.008
Eu-154	3.010E-01	4.29E-03	7.773E-01	1.12E-02	.387
Eu-155	4.131E-01	5.89E-03	1.345E-01	1.93E-03	3.071

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The next calculation done was to adjust the activities calculated using REDUCE97 to those presented in the 3<sup>rd</sup> column of Attachment F. After converting all of the activities to equivalent grams to allow their re-entry into an ORIGEN2 run, the activities of all or the radionuclides were then calculated using the ORIGEN2 run presented in Attachment G. The first decay time decays the activity to 1997 to allow an easy check to verify that the conversion of the inventory to grams and back to Ci did not significantly change the inventory calculated using REDUCE97 and as modified as noted above.

Up to this point in the calculations, results have been carried with 4 places of accuracy to minimize calculational errors. The final calculated radionuclide activities for a weighted average of all SBW in the Tank Farm have been rounded to 2 places of accuracy and are presented in Table 5.

While the activities actinides are relatively consistent, the concentration of fission products in Tank WM-183 is approximately 3 times higher than the calculated weighted average. It should be recognized that it probably will not be practical to blend the tanks to produce an average waste. Should wastes be processed directly from WM-183, direct radiation dose rates should be expected to be 3 times higher than what will be calculated for the average waste. While a rigorous uncertainty analysis was not done, the results for the weighted average activities for all of the waste storage tanks containing SBW are estimated to have an accuracy of  $\pm$  a factor of 2.

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**Table 5: Calculated Radionuclide Activities for Sodium Bearing Waste (Weighted Average) in Ci/L as a Function of Decay Time**

Nuclide (Actinides and Daughters)	Half-Life	2016	2035	Decay Time Since 2035 (yr)			
				1E2	5E2	1E3	
Tl207	4.770E+00	m	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Tl208	3.053E+00	m	8.5E-10	7.0E-10	3.2E-10	6.9E-12	
Tl209	2.200E+00	m	1.0E-14	2.8E-14	2.3E-13	4.3E-12	1.6E-11
Pb209	3.253E+00	h	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Pb210	2.226E+01	yr	6.7E-12	1.3E-11	6.0E-11	7.4E-10	2.3E-09
Pb211	3.610E+01	m	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Pb212	1.064E+01	h	2.4E-09	2.0E-09	9.0E-10	1.9E-11	1.6E-13
Pb214	2.680E+01	m	1.6E-11	2.6E-11	8.4E-11	7.4E-10	2.3E-09
Bi210m	3.000E+06	yr	2.7E-25	2.7E-25	2.7E-25	2.7E-25	2.7E-25
Bi210	5.013E+00	d	6.7E-12	1.3E-11	6.0E-11	7.4E-10	2.3E-09
Bi211	2.130E+00	m	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Bi212	6.055E+01	m	2.4E-09	2.0E-09	9.0E-10	1.9E-11	1.6E-13
Bi213	4.565E+01	m	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Bi214	1.990E+01	m	1.6E-11	2.6E-11	8.4E-11	7.4E-10	2.3E-09
Po210	1.384E+02	d	6.7E-12	1.3E-11	6.0E-11	7.4E-10	2.3E-09
Po212	3.000E-07	s	1.5E-09	1.3E-09	5.8E-10	1.2E-11	1.0E-13
Po216	1.460E-01	s	2.4E-09	2.0E-09	9.0E-10		
Po218	3.050E+00	m	1.6E-11	2.6E-11	8.4E-11	7.4E-10	2.3E-09
At217	3.230E-02	s	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Rn219	3.960E+00	s	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Rn220	5.561E+01	s	2.4E-09	2.0E-09	9.0E-10	1.9E-11	
Rn222	3.824E+00	d	1.6E-11	2.6E-11	8.4E-11	7.4E-10	2.3E-09
Fr221	4.800E+00	m	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Fr223	2.180E+01	m	9.7E-13	1.3E-12	2.1E-12	5.4E-12	9.1E-12
Ra223	1.143E+01	d	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Ra224	3.620E+00	d	2.4E-09	2.0E-09	9.0E-10	1.9E-11	1.6E-13
Ra225	1.480E+01	d	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Ra226	1.600E+03	yr	1.6E-11	2.6E-11	8.4E-11	7.4E-10	2.3E-09
Ra228	5.750E+00	yr	8.3E-16	9.1E-16	1.1E-15	1.9E-15	2.9E-15
Ac225	1.000E+01	d	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Ac227	2.177E+01	yr	7.0E-11	9.4E-11	1.5E-10	3.9E-10	6.6E-10
Ac228	6.130E+00	h	8.3E-16	9.1E-16	1.1E-15	1.9E-15	2.9E-15
Th227	1.872E+01	d	6.9E-11	9.3E-11	1.5E-10	3.8E-10	6.5E-10
Th228	1.913E+00	yr	2.4E-09	2.0E-09	9.0E-10	1.9E-11	1.6E-13
Th229	7.340E+03	yr	4.8E-13	1.3E-12	1.1E-11	2.0E-10	7.5E-10
Th230	7.700E+04	yr	1.1E-09	1.3E-09	2.1E-09	6.2E-09	1.1E-08
Th231	2.552E+01	h	2.6E-08	2.6E-08	2.6E-08	2.6E-08	2.6E-08
Th232	1.405E+10	yr	9.0E-16	9.4E-16	1.1E-15	1.9E-15	2.9E-15
Th234	2.410E+01	d	2.6E-08	2.6E-08	2.6E-08	2.6E-08	2.6E-08
Pa231	3.726E+04	yr	1.2E-10	1.3E-10	1.7E-10	3.9E-10	6.6E-10
Pa233	2.700E+01	d	3.6E-06	3.6E-06	3.6E-06	3.6E-06	3.6E-06
Pa234m	1.170E+00	m	2.6E-08	2.6E-08	2.6E-08	2.6E-08	2.6E-08
Pa234	6.700E+00	h	3.3E-11	3.3E-11	3.3E-11	3.3E-11	3.3E-11
U232	7.200E+01	yr	2.3E-09	1.9E-09	8.8E-10	1.9E-11	1.5E-13
U233	1.592E+05	yr	3.0E-10	6.0E-10	1.9E-09	8.2E-09	1.6E-08
U234	2.445E+05	yr	1.0E-06	1.0E-06	1.1E-06	1.2E-06	1.2E-06
U235	7.038E+08	yr	2.6E-08	2.6E-08	2.6E-08	2.6E-08	2.6E-08
U236	2.342E+07	yr	4.1E-08	4.1E-08	4.1E-08	4.1E-08	4.2E-08
U237	6.750E+00	d	4.3E-09	1.7E-09	3.5E-11	8.7E-15	8.3E-15
U238	4.470E+09	yr	2.6E-08	2.6E-08	2.6E-08	2.6E-08	2.6E-08
U240	1.410E+01	h	8.4E-16	8.4E-16	8.4E-16	8.4E-16	8.4E-16

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**Table 5: Calculated Radionuclide Activities for Sodium Bearing Waste (Weighted Average) in Ci/L as a Function of Decay Time (Continued)**

<u>Nuclide</u> <u>(Actinides and Daughters Continued)</u>	<u>Half-Life</u>	<u>2016</u>	<u>2035</u>	<u>Decay Time Since 2035 (yr)</u>		
				<u>1E2</u>	<u>5E2</u>	<u>1E3</u>
Np237	2.140E+06	yr	3.6E-06	3.6E-06	3.6E-06	3.6E-06
Np238	2.117E+00	d	8.9E-11	8.1E-11	5.6E-11	9.1E-12
Np239	2.355E+00	d	2.6E-08	2.6E-08	2.6E-08	2.5E-08
Pu236	2.851E+00	yr	1.4E-10	1.4E-12		
Pu238	8.775E+01	yr	4.2E-04	3.6E-04	1.9E-04	8.1E-06
Pu239	2.413E+04	yr	6.7E-05	6.7E-05	6.7E-05	6.6E-05
Pu240	6.569E+03	yr	1.3E-05	1.2E-05	1.2E-05	1.2E-05
Pu241	1.440E+01	yr	1.7E-04	7.0E-05	1.4E-06	3.5E-10
Pu242	3.758E+05	yr	9.8E-09	9.8E-09	9.8E-09	9.8E-09
Pu244	8.260E+07	yr	8.4E-16	8.4E-16	8.4E-16	8.4E-16
Am241	4.322E+02	yr	6.6E-05	6.7E-05	6.1E-05	3.2E-05
Am242m	1.520E+02	yr	1.8E-08	1.6E-08	1.1E-08	1.8E-09
Am242	1.602E+01	h	1.8E-08	1.6E-08	1.1E-08	1.8E-09
Am243	7.380E+03	yr	2.6E-08	2.6E-08	2.6E-08	2.5E-08
Cm242	1.628E+02	d	1.5E-08	1.3E-08	9.2E-09	1.5E-09
Cm243	2.850E+01	yr	2.6E-08	1.6E-08	2.3E-09	1.3E-13
Cm244	1.811E+01	yr	1.3E-06	6.4E-07	2.9E-08	6.5E-15
Cm245	8.500E+03	yr	3.7E-10	3.7E-10	3.7E-10	3.4E-10
Cm246	4.750E+03	yr	2.4E-11	2.4E-11	2.4E-11	2.3E-11
Cm247	1.560E+07	yr	2.7E-17	2.7E-17	2.7E-17	2.7E-17
Cm248	3.390E+05	yr	2.9E-17	2.9E-17	2.9E-17	2.9E-17
Cf249	3.506E+02	yr	2.1E-17	2.0E-17	1.7E-17	7.8E-18
Cf250	1.308E+01	yr	8.8E-18	3.2E-18	-	2.9E-18
Cf251	9.000E+02	yr	3.3E-19	3.3E-19	3.1E-19	2.3E-19
<b>(Fission Products)</b>						
H 3	1.228E+01	yr	6.6E-06	2.3E-06	2.4E-08	4.3E-18
Be 10	1.600E+06	yr	3.7E-12	3.7E-12	3.7E-12	3.7E-12
C 14	5.730E+03	yr	1.5E-10	1.5E-10	1.4E-10	1.3E-10
Se 79	6.500E+04	yr	5.4E-07	5.4E-07	5.4E-07	5.3E-07
Rb 87	4.730E+10	yr	3.6E-11	3.6E-11	3.6E-11	3.6E-11
Sr 90	2.912E+01	yr	4.7E-02	3.0E-02	4.3E-03	3.2E-07
Y 90	6.410E+01	h	4.7E-02	3.0E-02	4.3E-03	3.2E-07
Zr 93	1.530E+06	yr	2.7E-06	2.7E-06	2.7E-06	2.7E-06
Nb 93m	1.360E+01	yr	2.3E-06	2.5E-06	2.6E-06	2.6E-06
Nb 94	2.030E+04	yr	1.4E-06	1.4E-06	1.4E-06	1.4E-06
Tc 98	4.200E+06	yr	3.2E-12	3.2E-12	3.2E-12	3.2E-12
Tc 99	2.130E+05	yr	1.2E-05	1.2E-05	1.2E-05	1.2E-05
Rh102	2.900E+00	yr	4.8E-11	5.1E-13		
Ru106	3.682E+02	d	1.5E-10			
Rh106	2.992E+01	s	1.5E-10			
Pd107	6.500E+06	yr	2.0E-08	2.0E-08	2.0E-08	2.0E-08
Ag108m	1.270E+02	yr	4.9E-13	4.4E-13	2.8E-13	3.2E-14
Cd113m	1.360E+01	yr	2.2E-06	9.0E-07	1.9E-08	1.1E-16
In115	5.100E+15	yr	1.2E-16	1.2E-16	1.2E-16	1.2E-16
Sn121m	5.000E+01	yr	6.9E-08	5.3E-08	1.7E-08	6.7E-11
Te123	1.000E+13	yr	4.7E-19	4.7E-19	4.7E-19	4.7E-19
Sb125	2.770E+00	yr	6.2E-07	5.3E-09	8.5E-18	
Te125m	5.800E+01	d	1.5E-07	1.3E-09		
Sn126	1.000E+05	yr	5.1E-07	5.1E-07	5.1E-07	5.0E-07
Sb126	1.240E+01	d	7.1E-08	7.1E-08	7.1E-08	7.1E-08

**ENGINEERING DESIGN FILE**

**Table 5: Calculated Radionuclide Activities for Sodium Bearing Waste (Weighted Average) in Ci/L as a Function of Decay Time (Continued)**

<u>Nuclide</u> <u>(Fission Products Continued)</u>	<u>Half-Life</u>	<u>2016</u>	<u>2035</u>	<u>Decay Time Since 2035 (yr)</u>		
				<u>1E2</u>	<u>5E2</u>	<u>1E3</u>
Sb126m	1.900E+01	m	5.1E-07	5.1E-07	5.1E-07	5.0E-07
I129	1.570E+07	yr	1.0E-05	1.0E-05	1.0E-05	1.0E-05
Cs134	2.062E+00	yr	3.3E-07	5.5E-10		
Cs135	2.300E+06	yr	1.1E-06	1.1E-06	1.1E-06	1.1E-06
Cs137	3.000E+01	yr	4.6E-02	3.0E-02	4.6E-03	4.4E-07
Ba137m	2.552E+00	m	4.4E-02	2.8E-02	4.3E-03	4.2E-07
La138	1.350E+11	yr	2.4E-16	2.4E-16	2.4E-16	2.4E-16
Ce142	1.050E+11	yr	3.7E-11	3.7E-11	3.7E-11	3.7E-11
Ce144	2.843E+02	d	7.3E-12			
Pr144	1.728E+01	m	7.3E-12			
Pr144m	7.200E+00	m	8.7E-14			
Nd144	2.100E+15	yr	2.0E-15	2.0E-15	2.0E-15	2.0E-15
Pm146	2.020E+03	d	1.2E-08	1.1E-09	4.2E-14	
Sm146	1.030E+08	yr	3.4E-13	3.4E-13	3.4E-13	3.4E-13
Pm147	2.623E+00	yr	6.8E-06	4.5E-08	2.3E-17	
Sm147	1.070E+11	yr	9.1E-12	9.1E-12	9.1E-12	9.1E-12
Sm148	8.000E+15	yr	4.7E-17	4.7E-17	4.7E-17	4.7E-17
Sm149	1.000E+15	yr	4.2E-18	4.2E-18	4.2E-18	4.2E-18
Eu150	3.600E+01	yr	1.4E-11	9.6E-12	2.0E-12	9.1E-16
Sm151	9.000E+01	yr	3.8E-04	3.2E-04	1.7E-04	8.0E-06
Eu152	1.360E+01	yr	1.6E-06	6.1E-07	9.9E-09	1.4E-17
Gd152	1.080E+14	yr	1.8E-18	1.8E-18	1.9E-18	1.9E-18
Eu154	8.600E+00	yr	7.0E-05	1.5E-05	2.2E-08	
Eu155	4.960E+00	yr	3.3E-05	2.3E-06	2.8E-11	
Ho166m	1.200E+03	yr	5.7E-11	5.6E-11	5.3E-11	4.2E-11
Tm171	1.920E+00	yr	5.7E-18			
<b>(Activation Products)</b>						
Co 60	5.271E+00	yr	8.1E-06	6.7E-07	1.6E-11	
Ni 63	1.001E+02	yr	3.5E-05	3.1E-05	1.7E-05	
Total			1.8E-01	1.2E-01	1.8E-02	1.7E-04
						1.3E-04

## **References**

- Nenni, J. A., 1995, letter to W. B. Palmer, "Alternative Sodium-Bearing Waste Calcination Flow Sheet Estimations, JAN-02-95, September 21, 1995.
- Rebish, K. J., Nenni, J. A., 1994, letter to B. H. O'Brien, "Tank Farm Inventory – June, 1994", KJR-02-94/JAN-03-94, June 23, 1994.
- RSIC (Radiation Shielding Information Center), 1991, *RSIC Computer Code Collection*, "ORIGEN2.1, Isotope Generation and Depletion Code Matrix Exponential Method", CCC-371, Oak Ridge, Tennessee.

# **Attachment A**

## Attachment A: Source Listing for FORTRAN Program TANKSUM

```
PROGRAM TANKSUM
C
C----- WRITTEN BY D.R. WENZEL
C
C           To normalize and sum radionuclide activities for
C           tanks containing sodium bearing waste (SBW)
C
C           CHARACTER * 7 NAME
C           REAL * 4 ACTIVITY(6), AMOUNT(6), VOL(6)
C
C           OPEN(3,FILE ='TANKS.IN', STATUS='OLD', FORM='FORMATTED',
C+             ERR = 900)
C           OPEN(6,FILE ='TANKS.OUT', STATUS='UNKNOWN', ERR = 920)
C+
C           READ(3,300) DUMMY
300   FORMAT(A1)
           READ(3,300) DUMMY
           READ(3,310) (VOL(I),I=1,6)
310   FORMAT(8X,6E10.2)
           READ(3,300) DUMMY
           WRITE(6,600)
600   FORMAT(1X,'tanks.out      Weighted average of tank activities',
C+             /,20x,'normalized',/,13X,'mCi/L', 4x,'to Cs-137')
20     READ(3,320,END=999) NAME, (ACTIVITY(I),I=1,6)
320   FORMAT(1X,A7,6E10.2)
           TOTAL = 0.
           TOTALVOL = 0.
           DO 40, I=1,6
               AMOUNT(I) = VOL(I) * ACTIVITY(I)
               IF(AMOUNT(I) .GT. 0.) THEN
                   TOTAL = TOTAL + AMOUNT(I)
                   TOTALVOL = TOTALVOL + VOL(I)
               ENDIF
C
40     CONTINUE
C
           CONC = TOTAL / TOTALVOL
           CSNORM = CONC / 7.015E+1
           WRITE(6,610) NAME, CONC, CSNORM
610   FORMAT(2X,A7,1PE10.3, 2X,1PE10.2)
C
           GO TO 20
C
C----- ERROR STATEMENTS
C
900   WRITE(6,9000)
9000  FORMAT(2X,'ERROR IN OPENING FILE 3')
           GO TO 999
C
920   WRITE(6,9020)
9020  FORMAT(2X,'ERROR IN OPENING FILE 6')
           GO TO 999
C
C----- PROGRAM END
C
```

**Attachment A: Source Listing for FORTRAN Program TANKSUM (Continued)**

999 CONTINUE  
END

# **Attachment B**

## Attachment B: Source Listing for FORTRAN Program REDUCE97

```
PROGRAM REDUCE97
C
C----- WRITTEN BY D.R. WENZEL
C
C           To calculate radionuclide activity sodium bearing
C           waste (SBW)
C
CHARACTER * 12 DESC, NAME, NUCLIDE(150)
CHARACTER * 111 BUFFER, ORGLINE
REAL * 4 GUEOL(3)
C
COMMON /AMT/ AMOUNT(9), FLAG
LOGICAL FLAG
C
REAL      * 4 DATA(150), VALUE(9)
C
C----- OPEN OUTPUT FILE
C
OPEN(6,FILE ='REDUCE97.OUT', STATUS='UNKNOWN', ERR = 900)
C
C----- Normalize to
C
GUEOL(1) = 154.5
GUEOL(2) = 515.5
GUEOL(3) = 59.55
CORFACT = 1. / GUEOL(1)
WRITE(6,600)
600 FORMAT(1x,'reduce97.out',//,13x,'Calculated Normalized',//,
+         1x,'Nuclide',7x,'mCi/L      to Cs-137')
C
C----- READ MASTER LIST OF RADIONUCLIDES
C
OPEN(1,FILE ='MASTER', STATUS='OLD', FORM='FORMATTED',
+     ERR = 900)
10 READ(1,100,END=20) NAME
100 FORMAT(A12)
LAST = LAST + 1
NUCLIDE(LAST) = NAME
GO TO 10
C
C----- ZERO MEMORY
C
20 DO 30 I=1,150
DATA(I) = 0.
30 CONTINUE
C
C----- READ RADIONUCLIDE INVENTORIES, NORMALIZE ACTIVITIES,
C           AND ADD RESULTS TO DATA
C
DO 80 I=1,13
IF(I .EQ. 5) CORFACT = 1. / GUEOL(2)
IF(I .EQ. 10) CORFACT = 1. / GUEOL(3)
CALL FILEOPN(I)
IF(FLAG) GO TO 900
C
```

## Attachment B: Source Listing for FORTRAN Program REDUCE97 (Continued)

```
C----- READ PAST FIRST 4 LINES
C
35 DO 40 J=1,4
    READ(1,120) ORGLINE
120     FORMAT(A111)
40 CONTINUE
C
C----- READ RADIONUCLIDE INVENTORIES, NORMALIZE ACTIVITIES,
C      AND ADD RESULTS TO DATA
C
50 READ(1,120,END=80) ORGLINE
    WRITE(BUFFER,120) ORGLINE
    READ(BUFFER,400) DESC, (VALUE(J),J=1,9)
400 FORMAT(A12,9X,9(1X,E9.4))
    DO 70 J=1,150
        IF(DESC .EQ. NUCLIDE(J)) THEN
            DO 60 K=1,7
                IF(AMOUNT(K) .NE. 0.) THEN
                    DATA(J) = DATA(J) + VALUE(K+2) * AMOUNT(K)
                    *
                    * CORFACT
C
C               ENDIF
C
60         CONTINUE
C
C               ENDIF
C
70     CONTINUE
C
GO TO 50
C
80     CONTINUE
C
C----- Normalize activities to measured Cs-137 concentration
C      of 69.6 mCi/L
C
CSNORM = 69.6 / DATA(118)
    DO 90 I=1,LAST
        ACTIVITY = DATA(I) * CSNORM
        RATIO = ACTIVITY / 69.6
        WRITE(6,610) NUCLIDE(I), ACTIVITY, RATIO
610     FORMAT(A12,1PE10.3,2x,1PE10.2)
    90 CONTINUE
    GO TO 999
C
C----- ERROR STATEMENTS
C
900 WRITE(6,9000)
9000 FORMAT(2X,'ERROR IN OPENING FILE ')
C
C----- PROGRAM END
C
999 CONTINUE
END
SUBROUTINE FILEOPN(I)
```

## Attachment B: Source Listing for FORTRAN Program REDUCE97 (Continued)

```
C
C----- THIS SUBROUTINE LOADS THE DESIRED FILE
C
C      COMMON /AMT/ AMOUNT(9),FLAG
C                  LOGICAL FLAG
C
C-----The following table indicate the age of fuel in the
C      different fuel groups. Group 1 is not used.
C
C      Column number  1    2    3    4    5    6    7
C      Fuel Group     ----- Age of fuel (yr) -----
C      2            13   14   15   16   17   18   19
C      3            20   21   22   23   24   25   26
C      4            27   28   29   30   31   32   33
C      5            34   35   36   37   38   39   40
C      6            41   42   43   44   45   46   47
C
C
C      FLAG = .FALSE.
C      CLOSE(1)
C      GO TO (1,2,3,4,5,6,7,8,9,10,11,12),I
C
C----- OPEN DESIRED INPUT FILE
C
C      1  OPEN(1,FILE ='SBWAL2.OUT', STATUS='OLD',FORM='FORMATTED',
C           +      ERR = 900)
C
C----- Al fuel in Fuel Group 2
C
C      AMOUNT(1) = 0.
C      AMOUNT(2) = 0.
C      AMOUNT(3) = 0.
C      AMOUNT(4) = 0.
C      AMOUNT(5) = 0.
C      AMOUNT(6) = 296.
C      AMOUNT(7) = 0.
C      RETURN
C
C      2  OPEN(1,FILE ='SBWAL4.OUT', STATUS='OLD',FORM='FORMATTED',
C           +      ERR = 900)
C
C----- Al fuel in Fuel Group 4
C
C      AMOUNT(1) = 150.
C      AMOUNT(2) = 4.
C      AMOUNT(3) = 1309.
C      AMOUNT(4) = 0.
C      AMOUNT(5) = 670.
C      AMOUNT(6) = 41.
C      AMOUNT(7) = 366.
C      RETURN
C
C      3  OPEN(1,FILE ='SBWAL5.OUT', STATUS='OLD',FORM='FORMATTED',
C           +      ERR = 900)
C
C----- Al fuel in Fuel Group 5
```

## Attachment B: Source Listing for FORTRAN Program REDUCE97 (Continued)

```
C
      AMOUNT(1) = 0.
      AMOUNT(2) = 505.
      AMOUNT(3) = 795.
      AMOUNT(4) = 0.
      AMOUNT(5) = 45.
      AMOUNT(6) = 345.
      AMOUNT(7) = 91.
      RETURN
C
4  OPEN(1,FILE ='SBWAL6.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Al fuel in Fuel Group 6
C
      AMOUNT(1) = 277.
      AMOUNT(2) = 727.
      AMOUNT(3) = 712.
      AMOUNT(4) = 443.
      AMOUNT(5) = 620.
      AMOUNT(6) = 341.
      AMOUNT(7) = 0.
      RETURN
C
5  OPEN(1,FILE ='SBWZR2.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Zr fuel in Fuel Group 2
C
      AMOUNT(1) = 30
      AMOUNT(2) = 641.
      AMOUNT(3) = 0.
      AMOUNT(4) = 810.
      AMOUNT(5) = 723.
      AMOUNT(6) = 408.
      AMOUNT(7) = 706.
      RETURN
C
6  OPEN(1,FILE ='SBWZR3.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Zr fuel in Fuel Group 3
C
      AMOUNT(1) = 342.
      AMOUNT(2) = 0.
      AMOUNT(3) = 0.
      AMOUNT(4) = 600.
      AMOUNT(5) = 0.
      AMOUNT(6) = 0.
      AMOUNT(7) = 0.
      RETURN
C
7  OPEN(1,FILE ='SBWZR4.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Zr fuel in Fuel Group 4
```

## Attachment B: Source Listing for FORTRAN Program REDUCE97 (Continued)

```
C
      AMOUNT(1) = 206.
      AMOUNT(2) = 800.
      AMOUNT(3) = 1478.
      AMOUNT(4) = 0.
      AMOUNT(5) = 17.
      AMOUNT(6) = 0.
      AMOUNT(7) = 0.
      RETURN
C
 8  OPEN(1,FILE ='SBWZR5.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Zr fuel in Fuel Group 5
C
      AMOUNT(1) = 4.
      AMOUNT(2) = 0.
      AMOUNT(3) = 0.
      AMOUNT(4) = 0.
      AMOUNT(5) = 0.
      AMOUNT(6) = 0.
      AMOUNT(7) = 0.
      RETURN
C
 9  OPEN(1,FILE ='SBWZR6.OUT', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
C
C----- Zr fuel in Fuel Group 6
C
      AMOUNT(1) = 15.
      AMOUNT(2) = 0.
      AMOUNT(3) = 0.
      AMOUNT(4) = 0.
      AMOUNT(5) = 0.
      AMOUNT(6) = 0.
      AMOUNT(7) = 0.
      RETURN
C
 10 OPEN(1,FILE ='SBWSS2.OUT', STATUS='OLD', FORM='FORMATTED',
+       ERR = 900)
C
C----- SS fuel in Fuel Group 2
C
      AMOUNT(1) = 0.
      AMOUNT(2) = 0.
      AMOUNT(3) = 0.
      AMOUNT(4) = 0.
      AMOUNT(5) = 0.
      AMOUNT(6) = 826.
      AMOUNT(7) = 0.
      RETURN
C
 11 OPEN(1,FILE ='SBWSS3.OUT', STATUS='OLD', FORM='FORMATTED',
+       ERR = 900)
C
C----- SS fuel in Fuel Group 3
```

## Attachment B: Source Listing for FORTRAN Program REDUCE97 (Continued)

```
C
      AMOUNT(1) = 0.
      AMOUNT(2) = 0.
      AMOUNT(3) = 371.
      AMOUNT(4) = 0.
      AMOUNT(5) = 3140.
      AMOUNT(6) = 0.
      AMOUNT(7) = 1544.
      RETURN
C
      12 OPEN(1,FILE ='SBWSS5.OUT', STATUS='OLD', FORM='FORMATTED',
           +          ERR = 900)
C
C----- SS fuel in Fuel Group 5
C
      AMOUNT(1) = 69.
      AMOUNT(2) = 0.
      AMOUNT(3) = 0.
      AMOUNT(4) = 0.
      AMOUNT(5) = 0.
      AMOUNT(6) = 75.
      AMOUNT(7) = 0.
      RETURN
C
      900 FLAG = .TRUE.
      RETURN
      END
```

# **Attachment C**

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time**

```
-1  
-1  
-1  
RDA      ORIGEN2, VERSION 2.1 (8-1-91) MTR  
BAS      ONE MTR ELEMENT  
CUT      -1  
LIP      0 0 0  
LIB      0 1 2 3 204 908 909 9 50 0 4 0  
TIT      ONE CYCLE FOR ONE MTR ELEMENT  
INP      -1 1 -1 -1 1 1  
MOV      -1 1 0 1.0  
HED      1  
BUP  
IRP      400.0 .4065 1 2 3 2  
IRP      800.0 .4065 2 3 3 0  
IRP      1600.0 .4065 3 4 3 0  
IRP      2000.0 .4065 4 5 3 0  
IRP      3100.0 .4065 5 6 3 0  
IRP      3336.0 .4065 6 7 3 0  
BUP  
OPTL     8 8 8 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
MOV      7 1 0 1.0  
DEC      1.0 1 2 5 4  
DEC      13.0 2 3 5 0  
DEC      14.0 3 4 5 0  
DEC      15.0 4 5 5 0  
DEC      16.0 5 6 5 0  
DEC      17.0 6 7 5 0  
DEC      18.0 7 8 5 0  
DEC      19.0 8 9 5 0  
OUT      -9 1 -1 0  
OUT      9 1 -1 0  
END  
2 922340 2.317 922350 200. 922360 .4343 922380 11.53 FUEL 93.3%  
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of  
ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **
echo **
echo **                                O R I G E N 2
echo **
echo **
echo **
copy sbwal2.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwal2.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
rem combine and save files from run
copy tape12.out+tape6.out sbwal2.u6 >nul
copy tape13.out+tape11.out sbwal2.u11 >nul
ren tape7.out sbwal2.pch
ren tape15.out sbwal2.dbg
ren tape16.out sbwal2.vxs
ren tape50.out sbwal2.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of  
ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwal2
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:21
      3336.0HR   1.0YR   13.0YR   14.0YR   15.0YR   16.0YR   17.0YR   18.0YR   19.0YR

TL206   5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24
TL207   2.138E-11 4.747E-10 1.752E-08 1.983E-08 2.223E-08 2.473E-08 2.734E-08 3.005E-08 3.287E-08
TL208   6.473E-08 4.873E-07 2.024E-06 2.037E-06 2.038E-06 2.034E-06 2.028E-06 2.018E-06 2.007E-06
TL209   1.012E-12 4.920E-13 2.856E-12 3.076E-12 3.299E-12 3.527E-12 3.758E-12 3.993E-12 4.232E-12
PB209   4.687E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
PB210   2.639E-13 1.021E-12 5.189E-10 6.393E-10 7.764E-10 9.310E-10 1.104E-09 1.296E-09 1.509E-09
PB211   2.144E-11 4.760E-10 1.757E-08 1.989E-08 2.229E-08 2.480E-08 2.742E-08 3.014E-08 3.296E-08
PB212   1.801E-07 1.356E-06 5.632E-06 5.670E-06 5.672E-06 5.662E-06 5.643E-06 5.617E-06 5.585E-06
PB214   3.342E-12 4.441E-11 4.141E-09 4.783E-09 5.471E-09 6.205E-09 6.984E-09 7.810E-09 8.682E-09
B1208   8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24
B1210M  5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24
B1210   2.286E-13 1.021E-12 5.189E-10 6.396E-10 7.767E-10 9.314E-10 1.105E-09 1.297E-09 1.509E-09
B1211   2.144E-11 4.760E-10 1.757E-08 1.989E-08 2.229E-08 2.480E-08 2.742E-08 3.014E-08 3.296E-08
B1212   1.801E-07 1.356E-06 5.632E-06 5.670E-06 5.672E-06 5.662E-06 5.643E-06 5.617E-06 5.585E-06
B1213   4.684E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
B1214   3.342E-12 4.441E-11 4.141E-09 4.783E-09 5.471E-09 6.205E-09 6.984E-09 7.810E-09 8.682E-09
PO210   3.462E-14 5.895E-13 5.189E-10 5.769E-10 6.950E-10 8.369E-10 9.977E-10 1.177E-09 1.376E-09
PO211   6.003E-14 1.333E-12 4.920E-11 5.569E-11 6.241E-11 6.944E-11 7.677E-11 8.439E-11 9.228E-11
PO212   1.154E-07 8.690E-07 3.608E-06 3.633E-06 3.634E-06 3.628E-06 3.616E-06 3.599E-06 3.578E-06
PO213   4.583E-11 2.229E-11 1.294E-10 1.393E-10 1.494E-10 1.598E-10 1.702E-10 1.809E-10 1.917E-10
PO214   6.517E-11 4.440E-11 4.141E-09 4.782E-09 5.470E-09 6.203E-09 6.983E-09 7.809E-09 8.681E-09
PO215   2.143E-11 4.760E-10 1.757E-08 1.989E-08 2.229E-08 2.480E-08 2.742E-08 3.014E-08 3.296E-08
PO216   1.801E-07 1.356E-06 5.632E-06 5.670E-06 5.672E-06 5.662E-06 5.643E-06 5.617E-06 5.585E-06
PO218   3.343E-12 4.442E-11 4.142E-09 4.784E-09 5.472E-09 6.206E-09 6.986E-09 7.812E-09 8.684E-09
AT217   4.684E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
RN218   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219   2.143E-11 4.760E-10 1.757E-08 1.989E-08 2.229E-08 2.480E-08 2.742E-08 3.014E-08 3.296E-08
RN220   1.801E-07 1.356E-06 5.632E-06 5.670E-06 5.672E-06 5.662E-06 5.643E-06 5.617E-06 5.585E-06
RN222   3.343E-12 4.442E-11 4.142E-09 4.784E-09 5.472E-09 6.206E-09 6.986E-09 7.812E-09 8.684E-09
FR221   4.684E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
FR223   6.187E-13 6.568E-12 2.425E-10 2.739E-10 3.070E-10 3.415E-10 3.776E-10 4.150E-10 4.539E-10
RA222   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223   2.143E-11 4.760E-10 1.757E-08 1.989E-08 2.229E-08 2.480E-08 2.742E-08 3.014E-08 3.296E-08
RA224   1.801E-07 1.356E-06 5.632E-06 5.670E-06 5.672E-06 5.662E-06 5.643E-06 5.617E-06 5.585E-06
RA225   6.181E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
RA226   3.553E-12 4.442E-11 4.142E-09 4.784E-09 5.472E-09 6.206E-09 6.986E-09 7.812E-09 8.684E-09
RA228   1.109E-16 2.982E-15 2.486E-13 2.800E-13 3.123E-13 3.456E-13 3.797E-13 4.145E-13 4.499E-13
AC225   4.684E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
AC227   4.483E-11 4.759E-10 1.757E-08 1.985E-08 2.225E-08 2.475E-08 2.736E-08 3.008E-08 3.289E-08
AC228   1.732E-09 2.982E-15 2.486E-13 2.800E-13 3.124E-13 3.456E-13 3.797E-13 4.145E-13 4.499E-13
TH226   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227   2.886E-11 4.695E-10 1.733E-08 1.962E-08 2.198E-08 2.446E-08 2.704E-08 2.972E-08 3.250E-08
TH228   1.929E-07 1.356E-06 5.632E-06 5.649E-06 5.651E-06 5.642E-06 5.623E-06 5.596E-06 5.565E-06
TH229   1.471E-11 2.278E-11 1.322E-10 1.424E-10 1.527E-10 1.633E-10 1.740E-10 1.849E-10 1.959E-10
TH230   4.089E-08 1.478E-07 1.432E-06 1.539E-06 1.646E-06 1.754E-06 1.861E-06 1.968E-06 2.075E-06
TH231   3.026E-03 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
TH232   8.250E-15 4.968E-14 5.468E-13 5.883E-13 6.297E-13 6.711E-13 7.125E-13 7.540E-13 7.954E-13
TH234   3.653E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA231   1.058E-08 1.673E-08 8.738E-08 9.329E-08 9.920E-08 1.051E-07 1.110E-07 1.169E-07 1.228E-07
PA233   1.963E-04 3.914E-04 3.915E-04 3.915E-04 3.915E-04 3.915E-04 3.916E-04 3.916E-04 3.916E-04
PA234M  1.035E-05 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA234   6.674E-06 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09
U230   6.179E-11 3.197E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232   3.666E-06 4.270E-06 5.703E-06 5.674E-06 5.640E-06 5.601E-06 5.560E-06 5.516E-06 5.471E-06
U233   8.448E-09 8.628E-08 1.068E-07 1.087E-07 1.106E-07 1.125E-07 1.144E-07 1.163E-07 1.182E-07
U234   1.188E-02 1.188E-02 1.190E-02 1.190E-02 1.190E-02 1.191E-02 1.191E-02 1.191E-02 1.191E-02
U235   2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
U236   8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04
U237   6.804E+03 8.142E-05 4.570E-05 4.355E-05 4.150E-05 3.955E-05 3.769E-05 3.592E-05 3.423E-05
U238   3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
U240   2.667E-02 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
NP235   6.603E-06 3.484E-06 1.625E-09 8.574E-10 4.525E-10 2.388E-10 1.260E-10 6.649E-11 3.509E-11
NP236   2.735E-09 2.735E-09 2.735E-09 2.735E-09 2.735E-09 2.735E-09 2.735E-09 2.735E-09 2.735E-09
NP237   3.326E-04 3.914E-04 3.915E-04 3.915E-04 3.915E-04 3.915E-04 3.916E-04 3.916E-04 3.916E-04
NP238   8.350E+02 6.303E-06 5.967E-08 5.940E-08 5.913E-08 5.886E-08 5.859E-08 5.832E-08 5.806E-08
NP239   4.242E+03 3.732E-05 3.728E-05 3.728E-05 3.727E-05 3.727E-05 3.726E-05 3.726E-05 3.726E-05
NP240M  2.946E+00 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
PU236   6.759E-05 5.505E-05 2.977E-06 2.334E-06 1.831E-06 1.436E-06 1.126E-06 8.829E-07 6.924E-07
PU237   8.211E-04 3.187E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238   6.601E-01 7.099E-01 6.457E-01 6.407E-01 6.356E-01 6.306E-01 6.256E-01 6.207E-01 6.158E-01
PU239   2.138E-02 2.253E-02 2.252E-02 2.252E-02 2.252E-02 2.251E-02 2.251E-02 2.251E-02 2.251E-02
PU240   1.159E-02 1.158E-02 1.157E-02 1.157E-02 1.157E-02 1.157E-02 1.157E-02 1.157E-02 1.156E-02
PU241   3.483E+00 3.319E+00 1.863E+00 1.775E+00 1.692E+00 1.612E+00 1.536E+00 1.464E+00 1.395E+00
PU242   1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05

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### Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

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sbwai2
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:21
      3336.0HR    1.0YR    13.0YR    14.0YR    15.0YR    16.0YR    17.0YR    18.0YR    19.0YR

PU243   5.971E+00 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
PU244   1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12
PU246   3.926E-09 2.886E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
AM241   4.933E-04 5.941E-03 5.384E-02 5.666E-02 5.935E-02 6.190E-02 6.432E-02 6.663E-02 6.881E-02
AM242M  1.266E-05 1.260E-05 1.193E-05 1.188E-05 1.183E-05 1.177E-05 1.172E-05 1.166E-05 1.161E-05
AM242   6.945E-01 1.254E-05 1.187E-05 1.182E-05 1.177E-05 1.171E-05 1.166E-05 1.161E-05 1.155E-05
AM243   3.687E-05 3.732E-05 3.728E-05 3.728E-05 3.728E-05 3.727E-05 3.727E-05 3.726E-05 3.726E-05
AM245   9.134E-06 1.966E-17 1.481E-21 6.715E-22 3.042E-22 1.378E-22 6.275E-23 2.859E-23 1.296E-23
AM246   3.928E-09 2.890E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
CM241   1.841E-08 1.625E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242   6.076E-02 1.339E-02 9.820E-06 9.786E-06 9.744E-06 9.700E-06 9.656E-06 9.612E-06 9.568E-06
CM243   7.409E-06 7.231E-06 5.400E-06 5.271E-06 5.144E-06 5.020E-06 4.900E-06 4.782E-06 4.667E-06
CM244   1.252E-03 1.206E-03 7.632E-04 7.345E-04 7.069E-04 6.804E-04 6.548E-04 6.302E-04 6.066E-04
CM245   5.058E-08 5.058E-08 5.053E-08 5.053E-08 5.052E-08 5.052E-08 5.051E-08 5.051E-08 5.051E-08
CM246   2.730E-09 2.730E-09 2.725E-09 2.724E-09 2.724E-09 2.724E-09 2.723E-09 2.723E-09 2.722E-09
CM247   2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
CM248   1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15
CM249   1.517E-10 4.781E-25 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250   1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22
BK249   2.968E-12 1.355E-12 1.021E-16 4.622E-17 2.096E-17 9.496E-18 4.326E-18 1.971E-18 8.659E-19
BK250   2.220E-11 2.908E-20 1.566E-23 1.566E-23 1.566E-23 1.566E-23 1.566E-23 1.566E-23 1.566E-23
CF249   1.429E-16 4.223E-15 7.441E-15 7.426E-15 7.411E-15 7.397E-15 7.382E-15 7.368E-15 7.353E-15
CF250   2.437E-14 2.370E-14 1.255E-14 1.190E-14 1.129E-14 1.071E-14 1.015E-14 9.629E-15 9.132E-15
CF251   7.275E-17 7.270E-17 7.203E-17 7.197E-17 7.192E-17 7.186E-17 7.181E-17 7.175E-17 7.170E-17
CF252   3.718E-15 2.859E-15 1.221E-16 9.391E-17 7.221E-17 5.552E-17 4.268E-17 3.281E-17 2.522E-17
CF253   2.289E-16 1.538E-22 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254   8.683E-19 1.238E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253   4.338E-17 5.662E-21 0.000E+00 0.000E+00 0.000E+C0 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254   7.277E-20 5.946E-21 9.740E-26 9.740E-26 9.740E-26 9.740E-26 9.740E-26 9.740E-26 9.740E-26
ES255   0.000E+00 7.952E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

H   3   7.917E-01 7.485E-01 3.817E-01 3.608E-01 3.411E-01 3.225E-01 3.049E-01 2.883E-01 2.725E-01
BE   10  5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09
C   14   2.032E-07 2.031E-07 2.029E-07 2.028E-07 2.028E-07 2.028E-07 2.028E-07 2.027E-07 2.027E-07
SE   79   7.301E-04 7.301E-04 7.300E-04 7.300E-04 7.300E-04 7.300E-04 7.300E-04 7.300E-04 7.300E-04
KR   81   4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11
KR   85   2.229E+01 2.093E+01 9.635E+00 9.031E+00 8.466E+00 7.936E+00 7.439E+00 6.973E+00 6.536E+00
RB   86   6.374E+00 8.152E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB   87   4.901E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08
SR   89   1.374E+04 9.133E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR   90   1.750E+02 1.708E+02 1.284E+02 1.254E+02 1.224E+02 1.196E+02 1.167E+02 1.140E+02 1.113E+02
Y   90   1.821E+02 1.709E+02 1.284E+02 1.254E+02 1.225E+02 1.196E+02 1.168E+02 1.140E+02 1.113E+02
Y   91   1.585E+04 2.111E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB   92   4.167E-10 6.279E-21 0.000E+00 0.000E+C0 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
Zr   93   3.745E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03
NB   93M  3.518E-05 2.110E-04 1.749E-03 1.840E-03 1.926E-03 2.008E-03 2.086E-03 2.160E-03 2.230E-03
NB   94   3.991E-08 3.991E-08 3.990E-08 3.989E-08 3.989E-08 3.989E-08 3.989E-08 3.989E-08 3.989E-08
Zr   95   1.685E+04 3.222E+02 7.696E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB   95   1.277E+04 7.219E+02 1.709E-18 3.381E-20 2.519E-23 1.876E-26 1.397E-29 1.040E-32 7.749E-36
NB   95M  1.172E+02 2.390E+00 5.709E-21 1.092E-22 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC   98   2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09
TC   99   2.347E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02
RH102   3.566E-04 2.808E-04 1.595E-05 1.256E-05 9.888E-06 7.786E-06 6.130E-06 4.827E-06 3.801E-06
RU103   9.711E+03 1.540E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M  8.753E+03 1.391E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106   3.363E+02 1.691E+02 4.410E-02 2.217E-02 1.155E-02 5.604E-03 2.817E-03 1.416E-03 7.121E-04
RH106   6.269E-02 1.691E+02 4.410E-02 2.217E-02 1.155E-02 5.604E-03 2.817E-03 1.416E-03 7.121E-04
AG106   4.289E-11 4.954E-24 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107   2.767E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05
AG108   6.009E-04 4.604E-11 4.312E-11 4.289E-11 4.266E-11 4.242E-11 4.219E-11 4.196E-11 4.173E-11
AG108M  5.202E-10 5.173E-10 4.845E-10 4.819E-10 4.793E-10 4.767E-10 4.741E-10 4.715E-10 4.689E-10
AG109M  2.051E+02 1.905E-08 2.731E-11 1.580E-11 9.154E-12 5.304E-12 3.074E-12 1.781E-12 1.032E-12
CD109   3.287E-08 1.905E-08 2.726E-11 1.580E-11 9.154E-12 5.304E-12 3.074E-12 1.781E-12 1.032E-12
AG110   6.477E+01 2.441E-03 1.281E-08 4.650E-09 4.688E-09 6.130E-10 2.226E-10 8.081E-11 2.934E-11
AG110M  5.055E-01 1.835E-01 9.630E-07 3.496E-07 1.269E-07 4.609E-08 1.673E-08 6.076E-09 2.206E-09
AG111   9.389E+01 1.643E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M  2.330E-02 2.225E-02 1.258E-02 1.200E-02 1.144E-02 1.091E-02 1.040E-02 9.921E-03 9.461E-03
IN114   6.136E-04 7.944E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M  1.379E-04 8.301E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M  4.274E+00 1.463E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115   1.756E-14 1.924E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14
IN115M  5.069E+01 1.028E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M  2.013E-02 2.837E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M  2.853E-01 1.015E-01 4.185E-07 1.489E-07 5.300E-08 1.886E-08 6.711E-09 2.388E-09 8.498E-10

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of  
ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwai2
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:21
      3336.0HR   1.0YR   13.0YR   14.0YR   15.0YR   16.0YR   17.0YR   18.0YR   19.0YR

SN121M    1.594E-04 1.572E-04 1.331E-04 1.313E-04 1.295E-04 1.277E-04 1.259E-04 1.242E-04 1.225E-04
SN123    1.017E+01 1.432E+00 8.734E-11 1.230E-11 1.733E-12 2.441E-13 3.438E-14 4.842E-15 6.820E-16
TE123    1.454E-16 1.958E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16
TE123M   1.750E-03 2.110E-04 1.992E-15 2.402E-16 2.898E-17 3.550E-18 3.995E-19 1.026E-20 1.026E-20
SB124    1.472E+00 2.194E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125    5.242E+01 2.060E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125    1.187E+01 9.639E+00 4.785E-01 3.725E-01 2.901E-01 2.258E-01 1.758E-01 1.369E-01 1.066E-01
TE125M   1.391E+00 2.331E+00 1.167E-01 9.089E-02 7.077E-02 5.510E-02 4.290E-02 3.341E-02 2.601E-02
SN126    6.517E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04
SB126    4.089E+00 9.124E-05 9.122E-05 9.122E-05 9.122E-05 9.122E-05 9.122E-05 9.122E-05 9.122E-05
SB126M   1.805E+00 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04 6.516E-04
TE127    5.137E+02 4.387E+00 3.451E-12 3.383E-13 3.316E-14 3.250E-15 3.186E-16 3.130E-17 3.068E-18
TE127M   4.291E+01 4.479E+00 3.523E-12 3.454E-13 3.385E-14 3.318E-15 3.253E-16 3.196E-17 3.099E-18
XE127    1.330E-04 1.271E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129    2.273E+03 1.134E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M   3.246E+02 1.742E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129     3.848E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05
XE129M   4.033E-02 7.274E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131     9.583E+03 2.083E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M   1.067E+02 1.919E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132    1.173E-01 1.222E-18 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133    2.117E+04 2.870E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134    1.270E+02 9.080E+01 1.608E+00 1.149E+00 8.207E-01 5.864E-01 4.190E-01 2.994E-01 2.139E-01
CS135    3.306E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04
CS136    5.980E+01 2.830E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M   1.150E+01 4.664E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137    1.819E+02 1.778E+02 1.347E+02 1.316E+02 1.286E+02 1.257E+02 1.228E+02 1.200E+02 1.173E+02
BA137M   1.730E+02 1.682E+02 1.274E+02 1.245E+02 1.217E+02 1.189E+02 1.162E+02 1.135E+02 1.109E+02
LA138    3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13
BA140    2.068E+04 5.230E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140    2.089E+04 6.019E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141    1.867E+04 7.792E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142    5.039E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08
FR143    1.898E+04 1.665E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144    5.275E+03 2.165E+03 4.942E-02 2.028E-02 8.323E-03 3.416E-03 1.402E-03 5.753E-04 2.361E-04
FR144    5.594E+03 2.165E+03 4.942E-02 2.028E-02 8.323E-03 3.416E-03 1.402E-03 5.753E-04 2.361E-04
FR144M   6.342E+01 2.598E+01 5.930E-04 2.434E-04 9.988E-05 4.099E-05 1.682E-05 6.904E-06 2.833E-06
ND144    5.878E-13 1.741E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12
PM146    2.574E-03 2.269E-03 5.001E-04 4.409E-04 3.887E-04 3.427E-04 3.021E-04 2.663E-04 2.348E-04
SM146    1.634E-11 2.520E-11 7.663E-11 7.835E-11 7.987E-11 8.121E-11 8.238E-11 8.342E-11 8.434E-11
ND147    7.443E+03 8.530E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
FM147    4.881E+02 4.415E+02 1.854E+01 1.423E+01 1.093E+01 8.390E+00 6.442E+00 4.946E+00 3.798E+00
SM147    5.724E-10 3.846E-09 1.422E-08 1.432E-08 1.440E-08 1.446E-08 1.451E-08 1.455E-08 1.458E-08
PM148    1.474E+03 1.476E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M   1.204E+02 2.620E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148    2.419E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14
SM149    2.474E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15
EU150    6.326E-09 6.205E-09 4.925E-09 4.831E-09 4.739E-09 4.648E-09 4.560E-09 4.473E-09 4.388E-09
SM151    7.416E-01 7.869E-01 7.175E-01 7.120E-01 7.065E-01 7.011E-01 6.957E-01 6.904E-01 6.851E-01
EU152    3.081E-03 4.828E-03 2.619E-03 2.489E-03 2.365E-03 2.248E-03 2.136E-03 2.030E-03 1.929E-03
GD152    2.092E-16 2.200E-16 2.975E-16 3.021E-16 3.064E-16 3.106E-16 3.145E-16 3.182E-16 3.217E-16
GD153    1.926E-02 6.767E-03 2.391E-08 8.400E-09 2.951E-09 1.037E-09 3.642E-10 1.279E-10 4.495E-11
EU154    5.721E+00 5.278E+00 2.007E+00 1.851E+00 1.708E+00 1.576E+00 1.454E+00 1.341E+00 1.237E+00
EU155    4.173E+00 3.629E+00 6.783E-01 5.898E-01 5.129E-01 4.460E-01 3.878E-01 3.372E-01 2.932E-01
EU156    2.372E+02 1.371E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160    2.424E-01 7.308E-03 4.125E-21 4.125E-21 4.125E-21 4.125E-21 4.125E-21 4.125E-21 4.125E-21
TB161    7.031E-01 9.090E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO166M   3.611E-08 3.609E-08 3.584E-08 3.582E-08 3.580E-08 3.578E-08 3.576E-08 3.574E-08 3.572E-08
ER169    2.216E-05 4.453E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170    3.880E-07 5.417E-08 2.972E-18 4.689E-19 3.605E-20 3.605E-20 3.605E-20 3.605E-20 3.605E-20
TM171    2.141E-09 1.492E-09 1.960E-11 1.366E-11 9.523E-12 6.637E-12 4.626E-12 3.224E-12 2.247E-12

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of  
ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) MTR
BAS      ONE MTR ELEMENT
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 204 908 909 9 50 0 4 0
TIT      ONE CYCLE FOR ONE MTR ELEMENT
INP      -1 1 -1 -1 1 1
MOV      -1 1 0 1.0
HED      1
BUP
IRP      400.0 .4065 1 2 3 2
IRP      800.0 .4065 2 3 3 0
IRP      1600.0 .4065 3 4 3 0
IRP      2000.0 .4065 4 5 3 0
IRP      3100.0 .4065 5 6 3 0
IRP      3336.0 .4065 6 7 3 0
BUP
OPTL     8 8 8 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8
MOV      7 1 0 1.0
DEC      1.0 1 2 5 4
DEC      27.0 2 3 5 0
DEC      28.0 3 4 5 0
DEC      29.0 4 5 5 0
DEC      30.0 5 6 5 0
DEC      31.0 6 7 5 0
DEC      32.0 7 8 5 0
DEC      33.0 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922340 2.317 922350 200. 922360 .4343 922380 11.53 FUEL 93.3%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwal4.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwal4.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
rem combine and save files from run
copy tape12.out+tape6.out sbwal4.u6 >nul
copy tape13.out+tape11.out sbwal4.u11 >nul
ren tape7.out sbwal4.pch
ren tape15.out sbwal4.dbg
ren tape16.out sbwal4.vxs
ren tape50.out sbwal4.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwalg
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:48
      3336.0HR   1.0YR   27.0YR   28.0YR   29.0YR   30.0YR   31.0YR   32.0YR   33.0YR

TL206  5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24
TL207  2.138E-11 4.747E-10 5.842E-08 6.212E-08 6.577E-08 6.948E-08 7.327E-08 7.712E-08 8.104E-08
TL208  6.473E-08 4.872E-07 1.861E-06 1.855E-06 1.841E-06 1.826E-06 1.810E-06 1.794E-06 1.778E-06
TL209  1.012E-12 4.920E-13 6.246E-12 6.514E-12 6.786E-12 7.062E-12 7.342E-12 7.626E-12 7.913E-12
PB209  4.687E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
PR210  2.639E-13 1.021E-12 4.022E-09 4.448E-09 4.901E-09 5.382E-09 5.890E-09 6.428E-09 6.994E-09
PB211  2.144E-11 4.760E-10 5.858E-08 6.229E-08 6.595E-08 6.968E-08 7.348E-08 7.734E-08 8.127E-08
PB212  1.801E-07 1.356E-06 5.178E-06 5.162E-06 5.123E-06 5.081E-06 5.037E-06 4.993E-06 4.948E-06
PB214  3.342E-12 4.441E-11 1.732E-08 1.860E-08 1.993E-08 2.131E-08 2.273E-08 2.420E-08 2.572E-08
BI208  8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24
BI210M 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24
BI210  2.286E-13 1.021E-12 4.022E-09 4.451E-09 4.904E-09 5.385E-09 5.894E-09 6.431E-09 6.998E-09
BI211  2.144E-11 4.760E-10 5.858E-08 6.229E-08 6.595E-08 6.968E-08 7.348E-08 7.734E-08 8.127E-08
BI212  1.801E-07 1.356E-06 5.178E-06 5.162E-06 5.123E-06 5.081E-06 5.037E-06 4.993E-06 4.948E-06
BI213  4.684E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
BI214  3.342E-12 4.441E-11 1.732E-08 1.860E-08 1.993E-08 2.131E-08 2.273E-08 2.420E-08 2.572E-08
PO210  3.462E-14 5.895E-13 4.022E-09 4.605E-09 5.059E-09 5.545E-09 6.061E-09 6.604E-09
PO211  6.003E-14 1.333E-12 1.640E-10 1.744E-10 1.847E-10 1.951E-10 2.057E-10 2.166E-10 2.276E-10
PO212  1.154E-07 8.690E-07 3.318E-06 3.307E-06 3.282E-06 3.255E-06 3.227E-06 3.199E-06 3.170E-06
PO213  4.583E-11 2.229E-11 2.829E-10 2.951E-10 3.074E-10 3.199E-10 3.326E-10 3.454E-10 3.584E-10
PO214  6.517E-11 4.440E-11 1.731E-08 1.860E-08 1.993E-08 2.131E-08 2.273E-08 2.420E-08 2.571E-08
PO215  2.143E-11 4.760E-10 5.858E-08 6.229E-08 6.595E-08 6.968E-08 7.348E-08 7.734E-08 8.127E-08
PO216  1.801E-07 1.356E-06 5.178E-06 5.162E-06 5.123E-06 5.081E-06 5.037E-06 4.993E-06 4.948E-06
PO218  3.343E-12 4.442E-11 1.732E-08 1.861E-08 1.994E-08 2.132E-08 2.274E-08 2.421E-08 2.573E-08
AT217  4.684E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
RN218  6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219  2.143E-11 4.760E-10 5.858E-08 6.229E-08 6.595E-08 6.968E-08 7.348E-08 7.734E-08 8.127E-08
RN220  1.801E-07 1.356E-06 5.178E-06 5.162E-06 5.123E-06 5.081E-06 5.037E-06 4.993E-06 4.948E-06
RN222  3.343E-12 4.442E-11 1.732E-08 1.861E-08 1.994E-08 2.132E-08 2.274E-08 2.421E-08 2.573E-08
FR221  4.684E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
FR223  6.187E-13 6.568E-12 8.084E-10 8.578E-10 9.082E-10 9.595E-10 1.012E-09 1.065E-09 1.119E-09
RA222  6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223  2.143E-11 4.760E-10 5.858E-08 6.229E-08 6.595E-08 6.968E-08 7.348E-08 7.734E-08 8.127E-08
RA224  1.801E-07 1.356E-06 5.178E-06 5.162E-06 5.123E-06 5.081E-06 5.037E-06 4.993E-06 4.948E-06
RA225  6.181E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
RA226  3.553E-12 4.442E-11 1.732E-08 1.861E-08 1.994E-08 2.132E-08 2.274E-08 2.421E-08 2.572E-08
RA228  1.109E-16 2.982E-15 7.504E-13 7.895E-13 8.288E-13 8.683E-13 9.080E-13 9.478E-13 9.879E-13
AC225  4.684E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
AC227  4.483E-11 4.759E-10 5.858E-08 6.216E-08 6.581E-08 6.953E-08 7.332E-08 7.717E-08 8.109E-08
AC228  1.732E-09 2.982E-15 7.504E-13 7.895E-13 8.288E-13 8.684E-13 9.081E-13 9.479E-13 9.880E-13
TH226  6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227  2.886E-11 4.695E-10 5.778E-08 6.143E-08 6.504E-08 6.872E-08 7.246E-08 7.627E-08 8.015E-08
TH228  1.929E-07 1.356E-06 5.178E-06 5.143E-06 5.104E-06 5.062E-06 5.019E-06 4.974E-06 4.929E-06
TH229  1.471E-11 2.278E-11 2.892E-10 3.016E-10 3.142E-10 3.270E-10 3.399E-10 3.530E-10 3.664E-10
TH230  4.089E-08 1.478E-07 2.933E-06 3.041E-06 3.148E-06 3.255E-06 3.363E-06 3.470E-06 3.577E-06
TH231  3.026E-03 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
TH232  8.250E-15 4.968E-14 1.127E-12 1.168E-12 2.120E-12 2.251E-12 1.293E-12 1.334E-12 1.375E-12
TH234  3.653E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA231  1.058E-08 1.673E-08 1.698E-07 1.757E-07 1.816E-07 1.875E-07 1.934E-07 1.993E-07 2.052E-07
PA233  1.963E-04 3.914E-04 3.918E-04 3.919E-04 3.919E-04 3.919E-04 3.919E-04 3.920E-04 3.920E-04
PA234M 1.035E-05 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA234  6.674E-06 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09
U230  6.179E-11 3.197E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232  3.666E-06 4.270E-06 5.087E-06 5.039E-06 4.992E-06 4.945E-06 4.898E-06 4.851E-06 4.805E-06
U233  8.448E-08 8.628E-08 1.308E-07 1.327E-07 1.346E-07 1.365E-07 1.384E-07 1.403E-07 1.422E-07
U234  1.188E-02 1.188E-02 1.193E-02 1.193E-02 1.193E-02 1.193E-02 1.193E-02 1.193E-02 1.193E-02
U235  2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
U236  8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04
U237  6.804E+03 8.142E-05 2.329E-05 2.220E-05 2.115E-05 2.016E-05 1.921E-05 1.831E-05 1.745E-05
U238  3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
U240  2.667E-02 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
NP235  6.603E-06 3.484E-06 2.110E-13 1.113E-13 5.875E-14 3.101E-14 1.636E-14 8.634E-15 4.556E-15
NP236  2.735E-09 2.735E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09
NP237  3.326E-04 3.914E-04 3.918E-04 3.918E-04 3.918E-04 3.919E-04 3.919E-04 3.919E-04 3.920E-04
NP238  8.350E+02 6.303E-08 5.598E-08 5.573E-08 5.547E-08 5.522E-08 5.497E-08 5.472E-08 5.447E-08
NP239  4.124E+03 3.732E-05 3.723E-05 3.723E-05 3.723E-05 3.722E-05 3.722E-05 3.722E-05 3.721E-05
NP240M 2.946E+00 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
PU236  6.759E-05 5.505E-05 9.930E-08 7.792E-08 6.116E-08 4.801E-08 3.770E-08 2.962E-08 2.328E-08
PU237  8.211E-04 3.187E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238  6.601E-01 7.099E-01 5.781E-01 5.736E-01 5.691E-01 5.646E-01 5.601E-01 5.557E-01 5.514E-01
PU239  2.138E-02 2.253E-02 2.251E-02 2.251E-02 2.251E-02 2.251E-02 2.251E-02 2.251E-02 2.250E-02
PU240  1.159E-02 1.158E-02 1.156E-02 1.155E-02 1.155E-02 1.155E-02 1.155E-02 1.155E-02 1.155E-02
PU241  3.483E+00 3.319E+00 9.494E-01 9.048E-01 8.623E-01 8.219E-01 7.831E-01 7.463E-01 7.113E-01
PU242  1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05

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## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

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sbwai4
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:48
      3336.0HR   1.0YR   27.0YR   28.0YR   29.0YR   30.0YR   31.0YR   32.0YR   33.0YR

PU243    5.971E+00 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
PU244    1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12
PU246    3.926E-09 2.886E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
AM241    4.933E-04 5.941E-03 8.269E-02 8.404E-02 8.532E-02 8.653E-02 8.768E-02 8.877E-02 8.979E-02
AM242M   1.266E-05 1.260E-05 1.120E-05 1.114E-05 1.109E-05 1.104E-05 1.099E-05 1.094E-05 1.089E-05
AM242    6.945E-01 1.254E-05 1.114E-05 1.109E-05 1.104E-05 1.099E-05 1.094E-05 1.089E-05 1.084E-05
AM243    3.687E-05 3.732E-05 3.723E-05 3.723E-05 3.722E-05 3.722E-05 3.722E-05 3.721E-05
AM245    9.134E-06 1.966E-17 2.294E-26 2.294E-26 2.294E-26 2.294E-26 2.294E-26 2.294E-26 2.294E-26
AM246    3.928E-09 2.890E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
CM241    1.841E-08 1.625E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    6.076E-02 1.339E-02 9.213E-06 9.181E-06 9.141E-06 9.100E-06 9.059E-06 9.018E-06 8.976E-06
CM243    7.409E-06 7.231E-06 3.842E-06 3.750E-06 3.660E-06 3.572E-06 3.486E-06 3.402E-06 3.320E-06
CM244    1.252E-03 1.208E-03 4.466E-04 4.298E-04 4.137E-04 3.981E-04 3.832E-04 3.688E-04 3.550E-04
CM245    5.058E-08 5.058E-08 5.047E-08 5.047E-08 5.047E-08 5.046E-08 5.046E-08 5.045E-08 5.045E-08
CM246    2.730E-09 2.730E-09 2.719E-09 2.719E-09 2.718E-09 2.718E-09 2.718E-09 2.717E-09 2.717E-09
CM247    2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
CM248    1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15
CM249    1.517E-10 4.781E-25 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22
BK249    2.968E-12 1.355E-12 1.582E-21 1.582E-21 1.582E-21 1.582E-21 1.582E-21 1.582E-21 1.582E-21
BK250    2.220E-11 2.908E-20 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23
CF249    1.429E-16 4.223E-15 7.238E-15 7.223E-15 7.209E-15 7.195E-15 7.181E-15 7.166E-15 7.152E-15
CF250    2.437E-14 2.370E-14 5.977E-15 5.668E-15 5.376E-15 5.098E-15 4.835E-15 4.585E-15 4.349E-15
CE251    7.275E-17 7.270E-17 7.126E-17 7.120E-17 7.115E-17 7.109E-17 7.104E-17 7.098E-17 7.093E-17
CE252    3.718E-15 2.859E-15 3.089E-18 2.384E-18 1.840E-18 1.420E-18 1.096E-18 8.457E-19 6.527E-19
CP253    2.289E-16 1.538E-22 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CP254    8.683E-19 1.238E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    4.338E-17 5.662E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    7.277E-20 5.946E-21 2.542E-31 2.542E-31 2.542E-31 2.542E-31 2.542E-31 2.542E-31 2.542E-31
ES255    0.000E+00 7.952E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
H 3      7.917E-01 7.485E-01 1.739E-01 1.644E-01 1.555E-01 1.470E-01 1.390E-01 1.314E-01 1.242E-01
BE 10    5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09
C 14     2.032E-07 2.031E-07 2.025E-07 2.025E-07 2.025E-07 2.024E-07 2.024E-07 2.024E-07 2.024E-07
SE 79     7.301E-04 7.301E-04 7.299E-04 7.299E-04 7.299E-04 7.299E-04 7.299E-04 7.299E-04 7.299E-04
KR 81     4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11
KR 85     2.229E+01 2.093E+01 3.897E+00 3.653E+00 3.424E+00 3.210E+00 3.009E+00 2.820E+00 2.644E+00
RB 86     6.374E+00 8.152E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87     4.901E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08
SR 89     1.374E+04 9.133E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90     1.750E+02 1.708E+02 9.201E+01 8.985E+01 8.773E+01 8.567E+01 8.366E+01 8.169E+01 7.977E+01
Y 90      1.821E+02 1.709E+02 9.204E+01 8.987E+01 8.776E+01 8.569E+01 8.368E+01 8.171E+01 7.979E+01
Y 91      1.585E+04 2.111E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92     4.167E-10 6.279E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
Zr 93     3.745E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03
NB 93M    3.518E-05 2.110E-04 2.680E-03 2.724E-03 2.766E-03 2.807E-03 2.845E-03 2.881E-03 2.915E-03
NB 94     3.991E-08 3.991E-08 3.988E-08 3.988E-08 3.987E-08 3.987E-08 3.987E-08 3.987E-08 3.987E-08
ZR 95     1.685E+04 3.222E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95     1.277E+04 7.219E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M    1.172E+02 2.390E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98     2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09
TC 99     2.347E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02
RH102    3.566E-04 2.808E-04 5.614E-07 4.421E-07 3.481E-07 2.741E-07 2.158E-07 1.699E-07 1.338E-07
RU103    9.711E+03 1.540E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M   8.753E+03 1.391E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106    3.363E+02 1.691E+02 2.907E-06 1.461E-06 7.348E-07 3.594E-07 1.857E-07 9.338E-08 4.695E-08
RH106    6.269E+02 1.691E+02 2.907E-06 1.461E-06 7.348E-07 3.594E-07 1.857E-07 9.338E-08 4.695E-08
AG106    4.269E-11 4.954E-24 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107    2.767E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05
AG108    6.009E-04 4.604E-11 3.995E-11 3.973E-11 3.952E-11 3.930E-11 3.909E-11 3.888E-11 3.866E-11
AG108M   5.202E-10 5.173E-10 4.489E-10 4.464E-10 4.440E-10 4.416E-10 4.392E-10 4.368E-10 4.344E-10
AG109M   2.051E+02 1.905E-08 1.315E-14 7.619E-15 4.415E-15 2.558E-15 1.483E-15 8.591E-16 4.978E-16
CD109    3.287E-08 1.905E-08 1.315E-14 7.619E-15 4.415E-15 2.558E-15 1.483E-15 8.591E-16 4.978E-16
AG110    6.477E+01 2.441E-03 8.859E-15 3.216E-15 1.168E-15 4.240E-16 1.539E-16 5.589E-17 2.029E-17
AG110M   5.055E-01 1.835E-01 6.661E-13 2.418E-13 8.780E-14 3.188E-14 1.157E-14 4.202E-15 1.526E-15
AG111    9.389E+01 1.643E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M   2.330E-02 2.225E-02 6.469E-03 6.169E-03 5.883E-03 5.510E-03 5.350E-03 5.101E-03 4.865E-03
IN114    6.136E-04 7.944E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M   1.379E-04 8.301E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M   4.274E+00 1.463E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115    1.756E-14 1.924E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14
IN115M   5.069E+01 1.028E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M   2.013E-02 2.837E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M   2.853E-01 1.015E-01 2.185E-13 7.774E-14 2.766E-14 9.844E-15 3.503E-15 1.247E-15 4.435E-16

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwala4
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:25:48
      3336.0HR   1.0YR   27.0YR   28.0YR   29.0YR   30.0YR   31.0YR   32.0YR   33.0YR

SN121M   1.594E-04 1.572E-04 1.096E-04 1.081E-04 1.066E-04 1.052E-04 1.037E-04 1.023E-04 1.009E-04
SN123   1.017E+01 1.432E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE123   1.454E-16 1.958E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16
TE123M  1.750E-03 2.110E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB124   1.472E+00 2.194E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125   5.242E+01 2.060E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125   1.187E+01 9.639E+00 1.444E-02 1.124E-02 8.752E-03 6.814E-03 5.305E-03 4.131E-03 3.216E-03
TE125M  1.391E+00 2.331E+00 3.522E-03 2.742E-03 2.135E-03 1.663E-03 1.294E-03 1.008E-03 7.847E-04
SN126   6.517E-04 6.516E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04
SB126   4.089E+00 9.124E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05
SB126M  1.805E+00 6.516E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04
TE127   5.137E+02 4.387E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE127M  4.291E+01 4.479E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE127   1.330E-04 1.271E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129   2.273E+03 1.134E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M  3.245E+02 1.742E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129   3.848E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05
XE129M  4.033E-02 7.274E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131   9.583E+03 2.083E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M  1.067E+02 1.919E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132   1.173E-01 1.222E-18 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133   2.117E+04 2.870E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134   1.270E+02 9.080E+01 1.453E-02 1.038E-02 7.418E-03 5.300E-03 3.787E-03 2.706E-03 1.933E-03
CS135   3.306E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04
CS136   6.980E+01 2.830E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M  1.150E+01 4.664E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137   1.819E+02 1.778E+02 9.749E+01 9.526E+01 9.308E+01 9.096E+01 8.888E+01 8.685E+01 8.487E+01
BA137M  1.730E+02 1.682E+02 9.222E+01 9.012E+01 8.806E+01 8.605E+01 8.408E+01 8.216E+01 8.028E+01
LA138   3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13
BA140   2.068E+04 5.230E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140   2.089E+04 6.019E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141   1.867E+04 7.792E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142   5.039E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08
PR143   1.898E+04 1.665E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144   5.275E+03 2.165E+03 1.900E-07 7.796E-08 3.200E-08 1.313E-08 5.389E-09 2.212E-09 9.076E-10
PR144   5.594E+03 2.165E+03 1.900E-07 7.797E-08 3.200E-08 1.313E-08 5.389E-09 2.212E-09 9.076E-10
PR144M  6.342E+01 2.598E+01 2.280E-09 9.356E-10 3.840E-10 1.576E-11 6.467E-11 2.654E-11 1.089E-11
ND144   5.878E-13 1.741E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12
PM146   2.574E-03 2.269E-03 8.567E-05 7.553E-05 6.658E-05 5.870E-05 5.175E-05 4.562E-05 4.022E-05
SM146   1.634E-11 2.520E-11 8.868E-11 8.897E-11 8.923E-11 8.946E-11 8.966E-11 8.984E-11 9.000E-11
ND147   7.443E+03 8.530E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM147   4.881E+02 4.415E+02 4.584E-01 3.519E-01 2.702E-01 2.075E-01 1.593E-01 1.223E-01 9.392E-02
SM147   5.724E-10 3.846E-09 1.466E-08 1.466E-08 1.466E-08 1.467E-08 1.467E-08 1.467E-08 1.467E-08
PM148   1.474E+03 1.476E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M  1.204E+02 2.620E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148   2.419E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14
SM149   2.474E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15
EU150   6.326E-09 6.205E-09 3.761E-09 3.689E-09 3.619E-09 3.550E-09 3.482E-09 3.416E-09 3.351E-09
SM151   7.416E-01 7.869E-01 6.441E-01 6.392E-01 6.343E-01 6.294E-01 6.246E-01 6.198E-01 6.150E-01
EU152   5.081E-03 4.828E-03 1.283E-03 1.220E-03 1.159E-03 1.101E-03 1.047E-03 9.946E-04 9.452E-04
GD152   2.092E-16 2.200E-16 3.444E-16 3.466E-16 3.488E-16 3.508E-16 3.527E-16 3.545E-16 3.563E-16
GD153   1.926E-02 6.767E-03 1.043E-14 3.663E-15 1.287E-15 4.520E-16 1.588E-16 5.582E-17 1.962E-17
EU154   5.721E+00 5.278E+00 6.493E-01 5.990E-01 5.526E-01 5.098E-01 4.703E-01 4.339E-01 4.003E-01
EU155   4.173E+00 3.629E+00 9.585E-02 8.334E-02 7.247E-02 6.302E-02 5.480E-02 4.765E-02 4.144E-02
EU156   2.372E+02 1.371E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160   2.424E-01 7.308E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB161   7.031E-01 9.090E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO16GM  3.611E-08 3.609E-08 3.555E-08 3.553E-08 3.551E-08 3.549E-08 3.547E-08 3.545E-08 3.543E-08
ER169   2.216E-05 4.453E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170   3.880E-07 5.417E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM171   2.141E-09 1.492E-09 1.251E-13 8.721E-14 6.078E-14 4.236E-14 2.953E-14 2.058E-14 1.434E-14

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) MTR
BAS      ONE MTR ELEMENT
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 204 908 909 9 50 0 4 0
TIT      ONE CYCLE FOR ONE MTR ELEMENT
INP      -1 1 -1 -1 1 1
MOV      -1 1 0 1.0
HED      1
BUP
IRP      400.0 .4065 1 2 3 2
IRP      800.0 .4065 2 3 3 0
IRP      1600.0 .4065 3 4 3 0
IRP      2000.0 .4065 4 5 3 0
IRP      3100.0 .4065 5 6 3 0
IRP      3336.0 .4065 6 7 3 0
BUP
OPTL     8 8 8 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
MOV      7 1 0 1.0
DEC      1.0 1 2 5 4
DEC      34.0 2 3 5 0
DEC      35.0 3 4 5 0
DEC      36.0 4 5 5 0
DEC      37.0 5 6 5 0
DEC      38.0 6 7 5 0
DEC      39.0 7 8 5 0
DEC      40.0 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922340 2.317 922350 200. 922360 .4343 922380 11.53 FUEL 93.3%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **
echo **                                O R I G E N 2
echo **
echo **
copy sbwal5.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwal5.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
rem combine and save files from run
copy tape12.out+tape6.out sbwal5.u6 >nul
copy tape13.out+tape11.out sbwal5.u11 >nul
ren tape7.out sbwal5.pch
ren tape15.out sbwal5.dbg
ren tape16.out sbwal5.vxs
ren tape50.out sbwal5.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo ***** O R I G E N 2 - Version 2.1 ****
echo ***** Execution Completed ****
echo ****
echo on
```

## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

```

sbwals5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:13
      3336.0HR   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

TL206    5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24
TL207    2.138E-11 4.747E-10 8.482E-08 8.904E-08 9.313E-08 9.728E-08 1.015E-07 1.057E-07 1.101E-07
TL208    6.473E-08 4.873E-07 1.757E-06 1.746E-06 1.729E-06 1.713E-06 1.697E-06 1.680E-06 1.664E-06
TL209    1.012E-12 4.920E-13 8.196E-12 8.488E-12 8.785E-12 9.085E-12 9.389E-12 9.697E-12 1.001E-11
PB209    4.687E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
PB210    2.639E-13 1.021E-12 7.592E-09 8.219E-09 8.876E-09 9.564E-09 1.028E-08 1.104E-08 1.182E-08
PB211    2.144E-11 4.760E-10 8.506E-08 8.929E-08 9.339E-08 9.755E-08 1.018E-07 1.060E-07 1.104E-07
PB212    1.801E-07 1.356E-06 4.889E-06 4.860E-06 4.813E-06 4.767E-06 4.722E-06 4.677E-06 4.632E-06
PB214    3.342E-12 4.441E-11 2.728E-08 2.889E-08 3.054E-08 3.224E-08 3.398E-08 3.578E-08 3.761E-08
B1208    8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24
B1210M   5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24
B1210    2.286E-13 1.021E-12 7.592E-09 8.223E-09 8.881E-09 9.569E-09 1.029E-08 1.104E-08 1.183E-08
B1211    2.144E-11 4.760E-10 8.506E-08 8.929E-08 9.339E-08 9.755E-08 1.018E-07 1.060E-07 1.104E-07
B1212    1.801E-07 1.356E-06 4.889E-06 4.860E-06 4.813E-06 4.767E-06 4.722E-06 4.677E-06 4.632E-06
B1213    4.684E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
B1214    3.342E-12 4.441E-11 2.728E-08 2.889E-08 3.054E-08 3.224E-08 3.398E-08 3.578E-08 3.761E-08
PO210    3.462E-14 5.895E-13 7.592E-09 7.848E-09 8.425E-09 9.079E-09 9.772E-09 1.050E-08 1.125E-08
PO211    6.003E-14 1.333E-12 2.382E-10 2.500E-10 2.615E-10 2.731E-10 2.850E-10 2.969E-10 3.090E-10
PO212    1.154E-07 8.690E-07 3.132E-06 3.114E-06 3.084E-06 3.054E-06 3.025E-06 2.996E-06 2.968E-06
PO213    4.583E-11 2.229E-11 3.712E-10 3.845E-10 3.979E-10 4.115E-10 4.253E-10 4.392E-10 4.534E-10
PO214    6.517E-11 4.440E-11 2.728E-08 2.888E-08 3.054E-08 3.223E-08 3.398E-08 3.577E-08 3.760E-08
PO215    2.143E-11 4.760E-10 8.506E-08 8.929E-08 9.339E-08 9.755E-08 1.018E-07 1.060E-07 1.104E-07
PO216    1.801E-07 1.356E-06 4.889E-06 4.860E-06 4.813E-06 4.767E-06 4.722E-06 4.677E-06 4.632E-06
PO218    3.343E-12 4.442E-11 2.729E-08 2.889E-08 3.055E-08 3.225E-08 3.399E-08 3.578E-08 3.762E-08
AT217    4.684E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
RN218    6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219    2.143E-11 4.760E-10 8.506E-08 8.929E-08 9.339E-08 9.755E-08 1.018E-07 1.060E-07 1.104E-07
RN220    1.801E-07 1.356E-06 4.889E-06 4.860E-06 4.813E-06 4.767E-06 4.722E-06 4.677E-06 4.632E-06
RN222    3.343E-12 4.442E-11 2.729E-08 2.889E-08 3.055E-08 3.225E-08 3.399E-08 3.578E-08 3.762E-08
FR221    4.684E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
FR223    6.187E-13 6.568E-12 1.174E-09 1.229E-09 1.286E-09 1.343E-09 1.401E-09 1.460E-09 1.520E-09
RA222    6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223    2.143E-11 4.760E-10 8.506E-08 8.929E-08 9.339E-08 9.755E-08 1.018E-07 1.060E-07 1.104E-07
RA224    1.801E-07 1.356E-06 4.889E-06 4.860E-06 4.813E-06 4.767E-06 4.722E-06 4.677E-06 4.632E-06
RA225    6.181E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
RA226    3.553E-12 4.442E-11 2.729E-08 2.889E-08 3.055E-08 3.225E-08 3.399E-08 3.578E-08 3.762E-08
RA228    1.109E-16 2.982E-15 1.028E-12 1.068E-12 1.109E-12 1.149E-12 1.190E-12 1.230E-12 1.271E-12
AC225    4.684E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
AC227    4.483E-11 4.759E-10 8.506E-08 8.909E-08 9.319E-08 9.734E-08 1.015E-07 1.058E-07 1.101E-07
AC228    1.732E-09 2.982E-15 1.028E-12 1.068E-12 1.109E-12 1.149E-12 1.190E-12 1.231E-12 1.271E-12
TH226    6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227    2.886E-11 4.695E-10 8.388E-08 8.806E-08 9.210E-08 9.621E-08 1.004E-07 1.046E-07 1.088E-07
TH228    1.929E-07 1.356E-06 4.889E-06 4.842E-06 4.796E-06 4.750E-06 4.704E-06 4.659E-06 4.615E-06
TH229    1.471E-11 2.278E-11 3.794E-10 3.930E-10 4.067E-10 4.206E-10 4.347E-10 4.489E-10 4.634E-10
TH230    4.089E-08 1.478E-07 3.685E-06 3.792E-06 3.900E-06 4.007E-06 4.115E-06 4.222E-06 4.329E-06
TH231    3.026E-03 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
TH232    8.250E-15 4.968E-14 1.417E-12 1.458E-12 1.500E-12 1.541E-12 1.583E-12 1.624E-12 1.665E-12
TH234    3.653E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA231    1.058E-08 1.673E-08 2.109E-07 2.168E-07 2.227E-07 2.286E-07 2.346E-07 2.405E-07 2.464E-07
PA233    1.963E-04 3.914E-04 3.920E-04 3.921E-04 3.921E-04 3.921E-04 3.922E-04 3.922E-04 3.922E-04
PA234M   1.035E-05 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA234    6.674E-06 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09
U230    6.179E-11 3.197E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232    3.666E-06 4.270E-06 4.759E-06 4.713E-06 4.668E-06 4.624E-06 4.580E-06 4.536E-06 4.492E-06
U233    8.448E-08 8.628E-08 1.428E-07 1.447E-07 1.466E-07 1.485E-07 1.504E-07 1.523E-07 1.542E-07
U234    1.188E-02 1.188E-02 1.194E-02 1.194E-02 1.194E-02 1.194E-02 1.194E-02 1.194E-02 1.194E-02
U235    2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
U236    8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04
U237    6.804E+03 8.142E-05 1.663E-05 1.585E-05 1.510E-05 1.439E-05 1.372E-05 1.307E-05 1.246E-05
U238    3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
U240    2.667E-02 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
NP235    6.603E-06 3.484E-06 2.404E-15 1.269E-15 6.696E-16 3.533E-16 1.865E-16 9.838E-17 5.191E-17
NP236    2.735E-09 2.735E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09
NP237    3.326E-04 3.914E-04 3.920E-04 3.920E-04 3.921E-04 3.921E-04 3.921E-04 3.922E-04 3.922E-04
NP238    8.350E+02 6.303E-08 5.422E-08 5.397E-08 5.373E-08 5.348E-08 5.324E-08 5.300E-08 5.276E-08
NP239    4.242E+03 3.732E-05 3.721E-05 3.721E-05 3.720E-05 3.720E-05 3.719E-05 3.719E-05 3.719E-05
NP240M   2.946E+00 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
PU236    6.759E-05 5.505E-05 1.829E-08 1.440E-08 1.134E-08 8.948E-09 7.070E-09 5.597E-09 4.442E-09
PU237    8.211E-04 3.187E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238    6.601E-01 7.099E-01 5.470E-01 5.427E-01 5.385E-01 5.342E-01 5.300E-01 5.258E-01 5.217E-01
PU239    2.138E-02 2.253E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02
PU240    1.159E-02 1.158E-02 1.155E-02 1.155E-02 1.154E-02 1.154E-02 1.154E-02 1.154E-02 1.154E-02
PU241    3.483E+00 3.319E+00 6.778E-01 6.460E-01 6.156E-01 5.867E-01 5.591E-01 5.328E-01 5.078E-01

```

## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

```

sbwals5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:13
      3336.0HR   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

PU242    1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05
PU243    5.971E+00 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
PU244    1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12
PU245    3.926E-09 2.886E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
AM241    4.933E-04 5.941E-03 9.076E-02 9.168E-02 9.254E-02 9.335E-02 9.412E-02 9.485E-02 9.553E-02
AM242M   1.266E-05 1.260E-05 1.084E-05 1.079E-05 1.075E-05 1.070E-05 1.065E-05 1.060E-05 1.055E-05
AM242    6.945E-01 1.254E-05 1.079E-05 1.074E-05 1.069E-05 1.064E-05 1.059E-05 1.055E-05 1.050E-05
AM243    3.687E-05 3.732E-05 3.721E-05 3.721E-05 3.720E-05 3.720E-05 3.719E-05 3.719E-05 3.719E-05
AM245    9.134E-06 1.966E-17 9.028E-29 9.027E-29 9.027E-29 9.027E-29 9.027E-29 9.027E-29 9.027E-29
AM246    3.928E-09 2.890E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
CM241    1.841E-08 1.625E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    6.076E-02 1.339E-02 8.923E-06 8.892E-06 8.854E-06 8.814E-06 8.774E-06 8.734E-06 8.694E-06
CM243    7.409E-06 7.231E-06 3.241E-06 3.163E-06 3.087E-06 3.013E-06 2.940E-06 2.870E-06 2.801E-06
CM244    1.252E-03 1.208E-03 3.416E-04 3.288E-04 3.165E-04 3.046E-04 2.931E-04 2.821E-04 2.715E-04
CM245    5.058E-08 5.058E-08 5.044E-08 5.044E-08 5.044E-08 5.043E-08 5.043E-08 5.042E-08 5.042E-08
CM246    2.730E-09 2.730E-09 2.716E-09 2.716E-09 2.716E-09 2.715E-09 2.715E-09 2.714E-09 2.714E-09
CM247    2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
CM248    1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15
CM249    1.517E-10 4.781E-25 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22
BK249    2.968E-12 1.355E-12 6.224E-24 6.224E-24 6.224E-24 6.224E-24 6.224E-24 6.224E-24 6.224E-24
BK250    2.220E-11 2.908E-20 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23
CF249    1.429E-16 4.223E-15 7.138E-15 7.124E-15 7.110E-15 7.096E-15 7.082E-15 7.068E-15 7.054E-15
CF250    2.437E-14 2.370E-14 4.124E-15 3.912E-15 3.710E-15 3.518E-15 3.337E-15 3.164E-15 3.001E-15
CF251    7.275E-17 7.270E-17 7.087E-17 7.082E-17 7.076E-17 7.071E-17 7.065E-17 7.060E-17 7.054E-17
CF252    3.718E-15 2.859E-15 4.903E-19 3.784E-19 2.790E-19 2.057E-19 1.516E-19 1.118E-19 8.242E-20
CF253    2.289E-16 1.538E-22 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254    8.683E-19 1.238E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    4.338E-17 5.662E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    7.277E-20 5.946E-21 4.108E-34 4.108E-34 4.108E-34 4.108E-34 4.108E-34 4.108E-34 4.108E-34
ES255    0.000E+00 7.952E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

H 3      7.917E-01 7.485E-01 1.174E-01 1.110E-01 1.050E-01 9.923E-02 9.381E-02 8.869E-02 8.385E-02
BE 10    5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09
C 14      2.032E-07 2.031E-07 2.023E-07 2.023E-07 2.023E-07 2.022E-07 2.022E-07 2.022E-07 2.022E-07
SE 79      7.301E-04 7.301E-04 7.299E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04
KR 81      4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11
KR 85      2.229E+01 2.093E+01 2.479E+00 2.323E+00 2.178E+00 2.041E+00 1.913E+00 1.794E+00 1.681E+00
RB 86      6.374E+00 8.152E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87      4.901E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08
SR 89      1.374E+04 9.133E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90      1.750E+02 1.708E+02 7.789E+01 7.606E+01 7.427E+01 7.252E+01 7.082E+01 6.915E+01 6.752E+01
Y 90       1.821E+02 1.709E+02 7.791E+01 7.608E+01 7.429E+01 7.254E+01 7.083E+01 6.917E+01 6.754E+01
Y 91       1.585E+04 2.111E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92      4.167E-10 6.279E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93      3.745E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03
NB 93M     3.518E-05 2.110E-04 2.949E-03 2.979E-03 3.009E-03 3.037E-03 3.063E-03 3.089E-03 3.113E-03
NB 94       3.991E-08 3.991E-08 3.987E-08 3.987E-08 3.986E-08 3.986E-08 3.986E-08 3.986E-08 3.986E-08
ZR 95       1.685E+04 3.222E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95      1.277E+04 7.219E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M     1.172E+02 2.390E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98      2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09
TC 99      2.347E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02
RH102     3.566E-04 2.808E-04 1.054E-07 8.299E-08 6.535E-08 5.145E-08 4.051E-08 3.190E-08 2.512E-08
RU103     9.711E+03 1.540E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M    8.753E+03 1.391E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106     3.363E+02 1.691E+02 2.360E-08 1.187E-08 5.966E-09 2.999E-09 1.508E-09 7.581E-10 3.812E-10
RH106     6.269E+02 1.691E+02 2.360E-08 1.187E-08 5.966E-09 2.999E-09 1.508E-09 7.581E-10 3.812E-10
AG106     4.269E-11 4.954E-24 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107     2.767E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05
AG108     6.009E-04 4.604E-11 3.845E-11 3.824E-11 3.804E-11 3.783E-11 3.762E-11 3.742E-11 3.722E-11
AG108M    5.202E-10 5.173E-10 4.321E-10 4.297E-10 4.274E-10 4.250E-10 4.227E-10 4.204E-10 4.181E-10
AG109M    2.051E+02 1.905E-08 2.885E-16 1.672E-16 9.686E-17 5.613E-17 3.254E-17 1.887E-17 1.094E-17
CD109     3.287E-08 1.905E-08 2.885E-16 1.672E-16 9.686E-17 5.612E-17 3.254E-17 1.887E-17 1.094E-17
AG110     6.477E-01 2.441E-03 3.7367E-18 2.6758E-18 9.716E-19 3.529E-19 1.281E-19 4.636E-20 1.712E-20
AG110M    5.055E-01 1.835E-01 5.539E-16 2.011E-16 7.305E-17 2.654E-17 9.600E-18 3.473E-18 1.287E-18
AG111     9.389E+01 1.643E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M    2.330E-02 2.225E-02 4.639E-03 4.424E-03 4.218E-03 4.023E-03 3.836E-03 3.658E-03 3.488E-03
IN114     6.136E-04 7.944E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M    1.379E-04 8.301E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M    4.274E+00 1.463E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115     1.756E-14 1.924E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14
IN115M    5.069E+01 1.028E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M    2.013E-02 2.837E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwals5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:13
      3336.0HR   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

SN119M    2.853E-01 1.015E-01 1.578E-16 5.620E-17 2.001E-17 7.092E-18 2.513E-18 9.153E-19 2.899E-19
SN121M    1.594E-04 1.572E-04 9.949E-05 9.812E-05 9.677E-05 9.544E-05 9.412E-05 9.283E-05 9.155E-05
SN123     1.017E+01 1.432E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE123     1.454E-16 1.958E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16 2.027E-16
TE123M   1.750E-03 2.110E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB124     1.472E+00 2.194E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125     5.242E+01 2.060E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125    1.187E+01 9.639E+00 2.498E-03 1.945E-03 1.514E-03 1.179E-03 9.180E-04 7.147E-04 5.565E-04
TE125M   1.391E+00 2.331E+00 6.094E-04 4.745E-04 3.695E-04 2.877E-04 2.240E-04 1.744E-04 1.358E-04
SN126     6.517E-04 6.516E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04
SB126    4.089E+00 9.124E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05 9.121E-05
SB126M   1.805E+00 6.516E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04 6.515E-04
TE127     5.137E+02 4.387E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE127M   4.291E+01 4.479E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE127    1.330E-04 1.271E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129    2.273E+03 1.134E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M   3.246E+02 1.742E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129     3.848E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05 4.047E-05
XE129M   4.033E-02 7.274E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131     9.583E+03 2.083E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M   1.067E+02 1.919E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132     1.173E-01 1.222E-18 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133     2.117E+04 2.870E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134     1.270E+02 9.080E+01 1.381E-03 9.870E-04 7.052E-04 5.039E-04 3.600E-04 2.572E-04 1.838E-04
CS135     3.306E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04 3.385E-04
CS136     6.980E+01 2.830E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M   1.150E+01 4.664E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137     8.819E+02 1.778E+02 8.293E+01 8.103E+01 7.918E+01 7.737E+01 7.561E+01 7.388E+01 7.219E+01
BA137M   1.730E+02 1.682E+02 7.845E+01 7.666E+01 7.491E+01 7.320E+01 7.152E+01 6.989E+01 6.829E+01
LA138     3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13 3.458E-13
BA140     2.068E+04 5.230E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140     2.089E+04 6.019E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141     1.867E+04 7.792E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142     5.039E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08 5.043E-08
PR143     1.898E+04 1.665E-04 0.0003E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+C0 0.000E+00 0.000E+00
CE144     5.275E+03 2.165E+03 3.725E-10 1.529E-10 6.273E-11 2.575E-11 1.057E-11 4.336E-12 1.780E-12
PR144     5.594E+03 2.165E+03 3.725E-10 1.529E-10 6.274E-11 2.575E-11 1.057E-11 4.336E-12 1.780E-12
PR144M   6.342E+01 2.598E+01 4.470E-12 1.834E-12 7.528E-13 3.090E-13 1.268E-13 5.203E-14 2.135E-14
ND144     5.878E-13 1.741E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12 2.544E-12
PM146     2.574E-03 2.269E-03 3.546E-05 3.126E-05 2.756E-05 2.429E-05 2.142E-05 1.888E-05 1.665E-05
SM146     1.634E-11 2.520E-11 9.014E-11 9.026E-11 9.037E-11 9.046E-11 9.054E-11 9.062E-11 9.068E-11
ND147     7.443E+03 8.530E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PN147     4.881E+02 4.415E+02 7.217E-02 5.541E-02 4.255E-02 3.267E-02 2.508E-02 1.926E-02 1.479E-02
SM147     5.724E-10 3.846E-09 1.467E-08 1.467E-08 1.467E-08 1.467E-08 1.467E-08 1.467E-08 1.467E-08
PM148     1.474E+03 1.476E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M   1.204E+02 2.620E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148     2.419E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14 2.860E-14
SM149     2.474E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15 5.903E-15
EU150     6.326E-09 6.205E-09 3.287E-09 3.224E-09 3.163E-09 3.102E-09 3.043E-09 2.985E-09 2.923E-09
SM151     7.416E-01 7.869E-01 6.103E-01 6.056E-01 6.010E-01 5.964E-01 5.918E-01 5.873E-01 5.829E-01
EUI52     5.081E-03 4.828E-03 8.982E-04 8.536E-04 8.112E-04 7.709E-04 7.326E-04 6.962E-04 6.616E-04
GD152     2.092E-16 2.200E-16 3.579E-16 3.595E-16 3.610E-16 3.624E-16 3.637E-16 3.650E-16 3.662E-16
GD153     1.926E-02 6.767E-03 6.886E-18 2.408E-18 8.673E-19 2.691E-19 1.348E-19 6.756E-20 0.000E+00
EUI54     5.721E+00 5.278E+00 3.693E-01 3.407E-01 3.143E-01 2.900E-01 2.675E-01 2.468E-01 2.277E-01
EUI55     4.173E+00 3.629E+00 3.603E-02 3.133E-02 2.724E-02 2.369E-02 2.060E-02 1.791E-02 1.558E-02
EUI56     2.372E+02 1.371E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB150     2.424E-01 7.308E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB161     7.031E-01 9.090E-17 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0
HO156M   3.611E-08 3.609E-08 3.541E-C8 3.539E-08 3.537E-08 3.535E-08 3.533E-08 3.531E-08 3.529E-C8
ER159     2.216E-05 4.453E-17 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0
TM170     3.880E-07 5.417E-08 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0 0.000E+C0
TM171     2.141E-09 1.492E-09 9.996E-15 6.967E-15 4.856E-15 3.384E-15 2.359E-15 1.644E-15 1.146E-15

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) MTR
BAS      ONE MTR ELEMENT
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 204 908 909 9 50 0 4 0
TIT      ONE CYCLE FOR ONE MTR ELEMENT
INP      -1 1 -1 -1 1 1
MOV      -1 1 0 1.0
HED      1
BUP
IRP      400.0 .4065 1 2 3 2
IRP      800.0 .4065 2 3 3 0
IRP      1600.0 .4065 3 4 3 0
IRP      2000.0 .4065 4 5 3 0
IRP      3100.0 .4065 5 6 3 0
IRP      3336.0 .4065 6 7 3 0
BUP
OPTL     8 8 8 8 8 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
MOV      7 1 0 1.0
DEC      1.0 1 2 5 4
DEC      41.0 2 3 5 0
DEC      42.0 3 4 5 0
DEC      43.0 4 5 5 0
DEC      44.0 5 6 5 0
DEC      45.0 6 7 5 0
DEC      46.0 7 8 5 0
DEC      47.0 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922340 2.317 922350 200. 922360 .4343 922380 11.53 FUEL 93.3%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **                                **
echo **
copy sbwal6.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwal6.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
rem combine and save files from run
copy tape12.out+tape6.out sbwal6.u6 >nul
copy tape13.out+tape11.out sbwal6.u11 >nul
ren tape7.out sbwal6.pch
ren tape15.out sbwal6.dbg
ren tape16.out sbwal6.vxs
ren tape50.out sbwal6.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo ***** O R I G E N 2 - Version 2.1 ****
echo ***** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbw16
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:46
      3336.0HR   1.0YR   41.0YR   42.0YR   43.0YR   44.0YR   45.0YR   46.0YR   47.0YR

TL206   5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24 5.801E-24
TL207   2.138E-11 4.747E-10 1.141E-07 1.188E-07 1.232E-07 1.277E-07 1.323E-07 1.369E-07 1.415E-07
TL208   6.473E-08 4.873E-07 1.642E-06 1.633E-06 1.617E-06 1.601E-06 1.586E-06 1.571E-06 1.556E-06
TL209   1.012E-12 4.920E-13 1.032E-11 1.063E-11 1.095E-11 1.128E-11 1.161E-11 1.194E-11 1.227E-11
PB209   4.687E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
PB210   2.639E-13 1.021E-12 1.264E-08 1.349E-08 1.437E-08 1.529E-08 1.624E-08 1.723E-08 1.825E-08
PB211   2.144E-11 4.760E-10 1.145E-07 1.191E-07 1.236E-07 1.281E-07 1.327E-07 1.372E-07 1.419E-07
PB212   1.801E-07 1.356E-06 4.571E-06 4.544E-06 4.500E-06 4.457E-06 4.414E-06 4.372E-06 4.330E-06
PB214   3.342E-12 4.441E-11 3.949E-08 4.142E-08 4.339E-08 4.541E-08 4.748E-08 4.959E-08 5.174E-08
BI208   8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24 8.650E-24
BI210M  5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24 5.824E-24
BI210   2.286E-13 1.021E-12 1.264E-08 1.350E-08 1.438E-08 1.530E-08 1.625E-08 1.724E-08 1.826E-08
BI211   2.144E-11 4.760E-10 1.145E-07 1.191E-07 1.236E-07 1.281E-07 1.327E-07 1.372E-07 1.419E-07
BI212   1.801E-07 1.356E-06 4.571E-06 4.544E-06 4.500E-06 4.457E-06 4.414E-06 4.372E-06 4.330E-06
BI213   4.684E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
BI214   3.342E-12 4.441E-11 3.949E-08 4.142E-08 4.339E-08 4.541E-08 4.748E-08 4.959E-08 5.174E-08
PO210   3.462E-14 5.895E-13 1.264E-08 1.296E-08 1.374E-08 1.461E-08 1.553E-08 1.649E-08 1.748E-08
PO211   6.003E-14 1.333E-12 3.205E-10 3.336E-10 3.461E-10 3.587E-10 3.714E-10 3.843E-10 3.973E-10
PO212   1.154E-07 8.690E-07 2.929E-06 2.911E-06 2.883E-06 2.856E-06 2.828E-06 2.801E-06 2.774E-06
PO213   4.583E-11 2.229E-11 4.672E-10 4.816E-10 4.961E-10 5.108E-10 5.257E-10 5.408E-10 5.560E-10
PO214   6.517E-11 4.440E-11 3.948E-08 4.141E-08 4.339E-08 4.540E-08 4.747E-08 4.958E-08 5.173E-08
PO215   2.143E-11 4.760E-10 1.145E-07 1.191E-07 1.236E-07 1.281E-07 1.327E-07 1.372E-07 1.419E-07
PO216   1.801E-07 1.356E-06 4.571E-06 4.544E-06 4.500E-06 4.457E-06 4.414E-06 4.372E-06 4.330E-06
PO218   3.343E-12 4.442E-11 3.950E-08 4.143E-08 4.340E-08 4.542E-08 4.749E-08 4.960E-08 5.176E-08
AT217   4.684E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
RN218   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219   2.143E-11 4.760E-10 1.145E-07 1.191E-07 1.236E-07 1.281E-07 1.327E-07 1.372E-07 1.419E-07
RN220   1.801E-07 1.356E-06 4.571E-06 4.544E-06 4.500E-06 4.457E-06 4.414E-06 4.372E-06 4.330E-06
RN222   3.343E-12 4.442E-11 3.950E-08 4.143E-08 4.340E-08 4.542E-08 4.749E-08 4.960E-08 5.176E-08
FR221   4.684E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
FR223   6.187E-13 6.560E-12 1.580E-09 1.640E-09 1.702E-09 1.764E-09 1.827E-09 1.890E-09 1.954E-09
RA222   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223   2.143E-11 4.760E-10 1.145E-07 1.191E-07 1.236E-07 1.281E-07 1.327E-07 1.372E-07 1.419E-07
RA224   1.801E-07 1.356E-06 4.571E-06 4.544E-06 4.500E-06 4.457E-06 4.414E-06 4.372E-06 4.330E-06
RA225   6.181E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
RA226   3.553E-12 4.442E-11 3.950E-08 4.143E-08 4.340E-08 4.542E-08 4.749E-08 4.960E-08 5.175E-08
RA228   1.109E-16 2.982E-15 1.312E-12 1.353E-12 1.394E-12 1.435E-12 1.476E-12 1.517E-12 1.558E-12
AC225   4.684E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
AC227   4.483E-11 4.759E-10 1.145E-07 1.189E-07 1.233E-07 1.278E-07 1.324E-07 1.370E-07 1.416E-07
AC228   1.732E-09 2.982E-15 1.312E-12 1.353E-12 1.394E-12 1.435E-12 1.476E-12 1.517E-12 1.558E-12
TH226   6.183E-11 3.201E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227   2.886E-11 4.695E-10 1.129E-07 1.175E-07 1.219E-07 1.263E-07 1.308E-07 1.354E-07 1.399E-07
TH228   1.929E-07 1.356E-06 4.571E-06 4.527E-06 4.484E-06 4.441E-06 4.398E-06 4.356E-06 4.314E-06
TH229   1.471E-11 2.278E-11 4.776E-10 4.922E-10 5.071E-10 5.221E-10 5.373E-10 5.527E-10 5.683E-10
TH230   4.089E-08 1.478E-07 4.437E-06 4.544E-06 4.652E-06 4.760E-06 4.867E-06 4.975E-06 5.082E-06
TH231   3.026E-03 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
TH232   8.250E-15 4.968E-14 1.707E-12 1.748E-12 1.790E-12 1.831E-12 1.873E-12 1.914E-12 1.955E-12
TH234   3.653E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA231   1.058E-08 1.673E-08 2.521E-07 2.580E-07 2.639E-07 2.698E-07 2.757E-07 2.816E-07 2.875E-07
PA233   1.963E-04 3.914E-04 3.922E-04 3.923E-04 3.923E-04 3.924E-04 3.924E-04 3.924E-04 3.924E-04
PA234M  1.035E-05 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
PA234   6.674E-06 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09 4.768E-09
U230   6.179E-11 3.197E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232   3.666E-06 4.270E-06 4.449E-06 4.407E-06 4.365E-06 4.323E-06 4.281E-06 4.240E-06 4.200E-06
U233   8.448E-08 8.628E-08 1.548E-07 1.567E-07 1.586E-07 1.605E-07 1.624E-07 1.643E-07 1.662E-07
U234   1.188E-02 1.188E-02 1.195E-02 1.195E-02 1.195E-02 1.195E-02 1.195E-02 1.195E-02 1.195E-02
U235   2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04 2.783E-04
U236   8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04 8.398E-04
U237   6.804E-03 8.142E-05 1.187E-05 1.131E-05 1.078E-05 1.027E-05 9.792E-06 9.332E-06 8.893E-06
U238   3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06 3.668E-06
U240   2.667E-02 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
NP235   6.603E-06 3.484E-06 2.740E-17 1.448E-17 7.653E-19 4.045E-18 2.110E-18 1.100E-18 5.738E-19
NP236   2.735E-09 2.735E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09 2.734E-09
NP237   3.326E-04 3.914E-04 3.922E-04 3.922E-04 3.923E-04 3.923E-04 3.924E-04 3.924E-04 3.924E-04
NP238   8.350E+02 6.303E-08 5.252E-08 5.228E-08 5.204E-08 5.180E-08 5.157E-08 5.133E-08 5.110E-08
NP239   4.242E+03 3.732E-05 3.718E-05 3.718E-05 3.718E-05 3.717E-05 3.717E-05 3.717E-05 3.716E-05
NP240M  2.946E+03 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12 1.054E-12
PU236   6.759E-05 5.505E-05 3.537E-09 2.826E-09 2.269E-09 1.833E-09 1.490E-09 1.222E-09 1.011E-09
PU237   8.211E-04 3.187E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238   6.601E-01 7.099E-01 5.176E-01 5.135E-01 5.095E-01 5.055E-01 5.015E-01 4.976E-01 4.936E-01
PU239   2.138E-02 2.253E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02 2.250E-02
PU240   1.159E-02 1.158E-02 1.154E-02 1.154E-02 1.154E-02 1.153E-02 1.153E-02 1.153E-02 1.153E-02
PU241   3.483E+00 3.319E+00 4.839E-01 4.612E-01 4.395E-01 4.188E-01 3.992E-01 3.804E-01 3.625E-01

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwalg
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:46
      3336.0HR   1.0YR   41.0YR   42.0YR   43.0YR   44.0YR   45.0YR   46.0YR   47.0YR

PU242    1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05 1.134E-05
PU243    5.971E+00 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
PU244    1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12 1.055E-12
PU246    3.926E-09 2.886E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
AM241    4.933E-04 5.941E-03 9.617E-02 9.677E-02 9.734E-02 9.787E-02 9.837E-02 9.883E-02 9.927E-02
AM242M   1.266E-05 1.260E-05 1.050E-05 1.046E-05 1.041E-05 1.036E-05 1.031E-05 1.026E-05 1.022E-05
AM242    6.945E-01 1.254E-05 1.045E-05 1.040E-05 1.036E-05 1.031E-05 1.026E-05 1.022E-05 1.017E-05
AM243    3.687E-05 3.732E-05 3.718E-05 3.718E-05 3.717E-05 3.717E-05 3.717E-05 3.716E-05 3.716E-05
AM245    9.134E-06 1.966E-17 3.553E-31 3.651E-31 3.651E-31 3.651E-31 3.651E-31 3.651E-31 3.651E-31
AM246    3.928E-09 2.890E-19 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23 2.779E-23
CM241    1.841E-08 1.625E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    6.076E-02 1.339E-02 8.643E-06 8.613E-06 8.576E-06 8.537E-06 8.498E-06 8.460E-06 8.421E-06
CM243    7.409E-06 7.231E-06 2.733E-06 2.668E-06 2.604E-06 2.541E-06 2.480E-06 2.420E-06 2.362E-06
CM244    1.252E-03 1.208E-03 2.613E-04 2.515E-04 2.421E-04 2.330E-04 2.242E-04 2.158E-04 2.077E-04
CM245    5.058E-08 5.058E-08 5.042E-08 5.041E-08 5.040E-08 5.040E-08 5.040E-08 5.039E-08
CM246    2.730E-09 2.730E-09 2.714E-09 2.713E-09 2.713E-09 2.712E-09 2.712E-09 2.712E-09 2.711E-09
CM247    2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15 2.277E-15
CM248    1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15 1.640E-15
CM249    1.517E-10 4.781E-25 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22 1.112E-22
BK249    2.968E-12 1.355E-12 2.450E-26 2.450E-26 2.450E-26 2.450E-26 2.450E-26 2.450E-26 2.450E-26
BK250    2.220E-11 2.908E-20 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23 1.556E-23
CF249    1.429E-16 4.223E-15 7.040E-15 7.026E-15 7.012E-15 6.998E-15 6.985E-15 6.971E-15 6.957E-15
CF250    2.437E-14 2.370E-14 2.846E-15 2.699E-15 2.560E-15 2.428E-15 2.303E-15 2.184E-15 2.071E-15
CF251    7.275E-17 7.270E-17 7.049E-17 7.044E-17 7.038E-17 7.033E-17 7.027E-17 7.022E-17 7.016E-17
CF252    3.718E-15 2.859E-15 7.793E-20 5.746E-20 4.236E-20 4.236E-20 4.236E-20 4.236E-20 4.236E-20
CF253    2.289E-16 1.538E-22 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254    8.683E-19 1.238E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    4.338E-17 5.662E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    7.277E-20 5.946E-21 6.640E-37 6.640E-37 6.640E-37 6.640E-37 6.640E-37 6.640E-37 6.640E-37
ES255    0.000E+00 7.952E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

H 3      7.917E-01 7.485E-01 7.927E-02 7.494E-02 7.085E-02 6.699E-02 6.333E-02 5.987E-02 5.660E-02
BE 10    5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09 5.037E-09
C 14     2.032E-07 2.031E-07 2.022E-07 2.021E-07 2.021E-07 2.021E-07 2.021E-07 2.020E-07 2.020E-07
SE 79     7.301E-04 7.301E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04 7.298E-04
KR 81     4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11 4.725E-11
KR 85     2.229E+01 2.093E+01 1.576E-00 1.477E+00 1.385E+00 1.298E+00 1.217E+00 1.141E+00 1.069E+00
RB 86     6.374E+00 8.152E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87     4.901E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08 4.904E-08
SR 89     1.374E+04 9.133E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90     1.750E+02 1.708E+02 6.594E+01 6.439E+01 6.287E+01 6.139E+01 5.995E+01 5.854E+01 5.716E+01
Y 90      1.821E+02 1.709E+02 6.595E+01 6.440E+01 6.289E+01 6.141E+01 5.996E+01 5.855E+01 5.718E+01
Y 91      1.585E+04 2.111E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92     4.167E-10 6.279E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93     3.745E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03 3.762E-03
NB 93M    3.518E-05 2.110E-04 3.136E-03 3.157E-03 3.178E-03 3.198E-03 3.216E-03 3.234E-03 3.251E-03
NB 94     3.991E-08 3.991E-08 3.986E-08 3.986E-08 3.985E-08 3.985E-08 3.985E-08 3.985E-08 3.985E-08
ZR 95     1.685E+04 3.222E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95     1.277E+04 7.219E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M    1.172E+02 2.390E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98     2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09 2.641E-09
TC 99     2.347E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02 2.424E-02
RH102    3.566E-04 2.808E-04 1.978E-08 1.557E-08 1.226E-08 9.656E-09 7.603E-09 5.987E-09 4.714E-09
RU103    9.711E+03 1.540E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M   8.753E+03 1.391E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106    3.363E+02 1.691E+02 1.916E-10 9.634E-11 4.844E-11 2.435E-11 1.224E-11 6.155E-12 3.095E-12
RH106    6.269E+02 1.691E+02 1.916E-10 9.634E-11 4.844E-11 2.435E-11 1.224E-11 6.155E-12 3.095E-12
AG106    4.269E-11 4.954E-24 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107    2.767E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05 2.768E-05
AG108    6.009E-04 4.604E-11 3.701E-11 3.681E-11 3.661E-11 3.641E-11 3.621E-11 3.602E-11 3.582E-11
AG108M   5.202E-10 5.173E-10 4.159E-10 4.136E-10 4.114E-10 4.091E-10 4.069E-10 4.047E-10 4.025E-10
AG109M   2.051E+02 1.905E-08 6.330E-18 3.668E-18 2.113E-18 1.218E-18 7.015E-19 4.207E-19 2.538E-19
CD109    3.287E-08 1.905E-08 6.330E-18 3.647E-18 2.101E-18 1.211E-18 6.975E-19 4.207E-19 2.538E-19
AG110    6.477E+01 2.441E-03 6.127E-21 2.225E-21 1.001E-21 3.635E-22 0.000E+00 0.000E+00 0.000E+00
AG110M   5.055E-01 1.835E-01 4.607E-19 1.505E-19 7.528E-20 0.000E+00 0.000E+00 0.000E+00 0.000E+00
AG111    9.389E+01 1.643E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M   2.330E-02 2.225E-02 3.326E-03 3.172E-03 3.025E-03 2.885E-03 2.751E-03 2.623E-03 2.501E-03
IN114    6.136E-04 7.944E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M   1.379E-04 8.301E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M   4.274E+00 1.463E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115    1.756E-14 1.924E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14 1.925E-14
IN115M   5.069E+01 1.028E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M   2.013E-02 2.837E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwalg6
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:26:46
      3336.0HR   1.0YR   41.0YR   42.0YR   43.0YR   44.0YR   45.0YR   46.0YR   47.0YR

SN119M  2.853E-01  1.015E-01  1.140E-19  5.708E-20  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN121M  1.594E-04  1.572E-04  9.029E-05  8.904E-05  8.782E-05  8.661E-05  8.541E-05  8.424E-05  8.308E-05
SN123   1.017E+01  1.432E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE123   1.454E-16  1.958E-16  2.027E-16  2.027E-16  2.027E-16  2.027E-16  2.027E-16  2.027E-16  2.027E-16
TE123M  1.750E-03  2.110E-04  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB124   1.472E+00  2.194E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN125   5.242E+01  2.060E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB125   1.187E+01  9.639E+00  4.333E-04  3.374E-04  2.627E-04  2.045E-04  1.592E-04  1.240E-04  9.654E-05
TE125M  1.391E+00  2.331E+00  1.057E-04  8.231E-05  6.409E-05  4.990E-05  3.885E-05  3.025E-05  2.355E-05
SN126   6.517E-04  6.516E-04  6.515E-04  6.515E-04  6.515E-04  6.514E-04  6.514E-04  6.514E-04  6.514E-04
SB126   4.089E+00  9.124E-05  9.121E-05  9.120E-05  9.120E-05  9.120E-05  9.120E-05  9.120E-05  9.120E-05
SB126M  1.805E+00  6.516E-04  6.515E-04  6.515E-04  6.515E-04  6.514E-04  6.514E-04  6.514E-04  6.514E-04
TE127   5.137E+02  4.387E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE127M  4.291E+01  4.179E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE127   1.330E-04  1.271E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129   2.273E+03  1.134E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129M  3.246E+02  1.742E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I129    3.848E-05  4.047E-05  4.047E-05  4.047E-05  4.047E-05  4.047E-05  4.047E-05  4.047E-05  4.047E-05
XE129M  4.033E-02  7.274E-16  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I131    9.583E+03  2.083E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE131M  1.067E+02  1.919E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS132   1.173E-01  1.222E-18  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE133   2.117E+04  2.870E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS134   1.270E+02  9.080E+01  1.313E-04  9.383E-05  6.704E-05  4.790E-05  3.423E-05  2.446E-05  1.747E-05
CS135   3.306E-04  3.385E-04  3.385E-04  3.385E-04  3.385E-04  3.385E-04  3.385E-04  3.385E-04  3.385E-04
CS136   6.980E+01  2.830E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
BA136M  1.150E+01  4.664E-08  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS137   1.819E+02  7.778E+02  7.054E+01  6.893E+01  6.736E+01  6.582E+01  6.432E+01  6.285E+01  6.141E+01
BA137M  1.730E+02  1.682E+02  6.673E+01  6.521E+01  6.372E+01  6.227E+01  6.084E+01  5.945E+01  5.810E+01
LA138   3.458E-13  3.458E-13  3.458E-13  3.458E-13  3.458E-13  3.458E-13  3.458E-13  3.458E-13  3.458E-13
BA140   2.068E+04  5.230E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
LA140   2.089E+04  6.019E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE141   1.867E+04  7.792E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE142   5.039E-08  5.043E-08  5.043E-08  5.043E-08  5.043E-08  5.043E-08  5.043E-08  5.043E-08  5.043E-08
PR143   1.898E+04  1.665E-04  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE144   5.275E+03  2.165E+03  7.303E-13  2.997E-13  1.230E-13  5.048E-14  2.072E-14  8.502E-15  3.489E-15
PR144   5.594E+03  2.165E+03  7.303E-13  2.997E-13  1.230E-13  5.048E-14  2.072E-14  8.502E-15  3.489E-15
PR144M  6.342E+01  2.598E+01  8.754E-15  3.597E-15  1.476E-15  6.058E-16  2.486E-15  1.020E-16  4.187E-17
ND144   5.878E-13  1.741E-12  2.544E-12  2.544E-12  2.544E-12  2.544E-12  2.544E-12  2.544E-12  2.544E-12
PM146   2.574E-03  2.269E-03  1.468E-05  1.294E-05  1.141E-05  1.006E-05  8.866E-05  7.816E-06  6.890E-06
SM146   1.634E-11  2.520E-11  9.074E-11  9.079E-11  9.084E-11  9.088E-11  9.091E-11  9.094E-11  9.097E-11
ND147   7.443E+03  8.530E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM147   4.881E+02  4.415E+02  1.135E-02  8.717E-03  6.693E-03  5.139E-03  3.946E-03  3.030E-03  2.326E-03
SM147   5.724E-10  3.846E-09  1.467E-08  1.467E-08  1.467E-08  1.467E-08  1.467E-08  1.467E-08  1.467E-08
PM148   1.474E+03  4.476E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM148M  1.204E+02  2.620E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SM148   2.419E-14  2.860E-14  2.860E-14  2.860E-14  2.860E-14  2.860E-14  2.860E-14  2.860E-14  2.860E-14
SM149   2.474E-15  5.903E-15  5.903E-15  5.903E-15  5.903E-15  5.903E-15  5.903E-15  5.903E-15  5.903E-15
EU150   6.326E-09  6.205E-09  2.872E-09  2.818E-09  2.764E-09  2.711E-09  2.660E-09  2.609E-09  2.559E-09
SM151   7.416E-01  7.869E-01  5.783E-01  5.738E-01  5.694E-01  5.651E-01  5.607E-01  5.564E-01  5.522E-01
EU152   5.081E-03  4.828E-03  6.287E-04  5.975E-04  5.678E-04  5.396E-04  5.128E-04  4.873E-04  4.631E-04
GD152   2.092E-16  2.200E-16  3.674E-16  3.685E-16  3.695E-16  3.705E-16  3.714E-16  3.723E-16  3.732E-16
GD153   1.926E-02  6.767E-03  4.547E-21  4.547E-21  4.547E-21  4.547E-21  4.547E-21  4.547E-21  4.547E-21
EU154   5.721E+00  5.278E+00  2.101E-01  1.936E-01  1.786E-01  1.650E-01  1.522E-01  1.404E-01  1.295E-01
EU155   4.173E+00  3.629E+00  1.355E-02  1.178E-02  1.025E-02  8.909E-03  7.747E-03  6.736E-03  5.857E-03
EU156   2.372E+02  1.371E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB160   2.424E-01  7.308E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB161   7.031E-01  9.090E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
HO166M  3.611E-08  3.609E-08  3.527E-08  3.524E-08  3.522E-08  3.520E-08  3.518E-08  3.516E-08  3.514E-08
ER169   2.216E-05  4.453E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TM170   3.880E-07  5.417E-08  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TM171   2.141E-09  1.492E-09  7.986E-16  5.566E-16  3.879E-16  2.704E-16  1.884E-16  1.314E-16  9.155E-17

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA    ORIGEN2, VERSION 2.1 (8-1-91) GENERIC FUEL
BAS    PWRU FUEL
RDA    -1 = 1 KG FUEL
RDA    WARNING: VECTORS ARE OFTEN CHANGED WITH RESPECT TO THEIR CONTENT.
RDA    THESE CHANGES WILL BE NOTED ON RDA CARDS.
CUT    -1
LIP    0 0 0
LIB    0 1 2 3 601 602 603 9 3 0 1 38
TIT    INITIAL COMPOSITIONS OF UNIT AMOUNTS OF FUEL AND STRUCT MAT'LS
RDA    READ FUEL COMPOSITION INCLUDING IMPURITIES
INP    -1 1 -1 -1 1 1
TIT    IRRADIATION OF GENERIC FUEL
MOV    -1 1 0 1.0
HED    1                                     CHARGE
BUP
IRP    100.0   .2577   1   2   4 2
IRP    200.0   .2577   2   3   4 0
IRP    400.0   .2577   3   4   4 0
IRP    600.0   .2577   4   5   4 0
IRP    800.0   .2577   5   6   4 0
IRP    1000.0  .2577   6   7   4 0
IRP    1200.0  .2577   7   8   4 0
IRP    1400.0  .2577   8   9   4 0
IRP    1600.0  .2577   9  10   4 0
IRP    1800.0  .2577  10  11   4 0
IRP    1826.0  .2577  11  12   4 0
BUP
OPTL   8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTA   8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTF   8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
MOV    12 1 0 1.0
DEC    1. 1 2 5 4
DEC    13. 2 3 5 0
DEC    14. 3 4 5 0
DEC    15. 4 5 5 0
DEC    16. 5 6 5 0
DEC    17. 6 7 5 0
DEC    18. 7 8 5 0
DEC    19. 8 9 5 0
OUT    -9 1 -1 0
OUT    9 1 -1 0
END
2 922350 1000.0 922360 .4366 922380 8.6636      0 0.0 FUEL 97%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwzr2.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwzr2.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\pwrus.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwzr2.u6 >nul
copy tape13.out+tapel1.out sbwzr2.u11 >nul
ren tape7.out sbwzr2.pch
ren tape15.out sbwzr2.dbg
ren tape16.out sbwzr2.vxs
ren tape50.out sbwzr2.ech
rem cleanup files
del tape*.inp
del tape*.out
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwzr2
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97      at 08:27:57
    1826.0D   1.0YR   13.0YR   14.0YR   15.0YR   16.0YR   17.0YR   18.0YR   19.0YR

TL206   4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21
TL207   7.215E-09 1.001E-08 7.674E-08 8.490E-08 9.324E-08 1.019E-07 1.108E-07 1.201E-07 1.296E-07
TL208   6.998E-06 1.406E-05 6.739E-05 6.828E-05 6.865E-05 6.882E-05 6.882E-05 6.869E-05 6.844E-05
TL209   4.390E-11 1.554E-11 2.086E-11 2.158E-11 2.235E-11 2.317E-11 2.403E-11 2.493E-11 2.589E-11
PB209   2.037E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
PB210   6.560E-12 6.959E-12 2.282E-11 2.729E-11 3.258E-11 3.878E-11 4.598E-11 5.426E-11 6.373E-11
PB211   7.235E-09 1.004E-08 7.696E-08 8.514E-08 9.350E-08 1.022E-07 1.112E-07 1.204E-07 1.300E-07
PB212   1.948E-05 3.912E-05 1.876E-04 1.900E-04 1.911E-04 1.915E-04 1.915E-04 1.912E-04 1.905E-04
PB214   2.127E-12 3.845E-12 1.546E-10 1.842E-10 2.173E-10 2.542E-10 2.949E-10 3.398E-10 3.889E-10
BZ208   5.624E-21 5.624E-21 5.624E-21 5.624E-21 5.624E-21 5.624E-21 5.624E-21 5.624E-21 5.624E-21
BZ210M  4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21
BZ210   6.481E-12 6.963E-12 2.282E-11 2.731E-11 3.260E-11 3.880E-11 4.600E-11 5.429E-11 6.376E-11
BZ211   7.235E-09 1.004E-08 7.696E-08 8.514E-08 9.350E-08 1.022E-07 1.112E-07 1.204E-07 1.300E-07
BZ212   1.948E-05 3.912E-05 1.876E-04 1.900E-04 1.911E-04 1.915E-04 1.915E-04 1.912E-04 1.905E-04
BZ213   2.032E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
BZ214   2.127E-12 3.845E-12 1.546E-10 1.842E-10 2.173E-10 2.542E-10 2.949E-10 3.398E-10 3.889E-10
PO210   4.211E-12 6.477E-12 2.282E-11 2.493E-11 3.230E-11 3.500E-11 4.156E-11 4.916E-11 5.787E-11
PO211   2.026E-11 2.811E-11 2.155E-10 2.384E-10 2.618E-10 2.861E-10 3.112E-10 3.372E-10 3.640E-10
PO212   1.248E-05 2.506E-05 1.202E-04 1.217E-04 1.224E-04 1.227E-04 1.227E-04 1.225E-04 1.220E-04
PO213   1.988E-09 7.037E-10 9.451E-10 9.777E-10 1.012E-09 1.049E-09 1.088E-09 1.129E-09 1.173E-09
PO214   2.076E-10 3.845E-12 1.546E-10 1.842E-10 2.173E-10 2.541E-10 2.949E-10 3.397E-10 3.888E-10
PO215   7.235E-09 1.004E-08 7.696E-08 8.514E-08 9.350E-08 1.022E-07 1.112E-07 1.204E-07 1.300E-07
PO216   1.948E-05 3.912E-05 1.876E-04 1.900E-04 1.911E-04 1.915E-04 1.915E-04 1.912E-04 1.905E-04
PO218   2.127E-12 3.846E-12 1.547E-10 1.842E-10 2.174E-10 2.542E-10 2.950E-10 3.398E-10 3.890E-10
AT217   2.032E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
RN218   2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219   7.235E-09 1.004E-08 7.696E-08 8.514E-08 9.350E-08 1.022E-07 1.112E-07 1.204E-07 1.300E-07
RN220   1.948E-05 3.912E-05 1.876E-04 1.900E-04 1.911E-04 1.915E-04 1.915E-04 1.912E-04 1.905E-04
RN222   2.127E-12 3.846E-12 1.547E-10 1.842E-10 2.174E-10 2.542E-10 2.950E-10 3.398E-10 3.890E-10
FR221   2.032E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
FR223   1.004E-10 1.383E-10 1.062E-09 1.172E-09 1.288E-09 1.407E-09 1.531E-09 1.658E-09 1.790E-09
RA222   2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223   7.235E-09 1.004E-08 7.696E-08 8.514E-08 9.350E-08 1.022E-07 1.112E-07 1.204E-07 1.300E-07
RA224   1.948E-05 3.912E-05 1.876E-04 1.900E-04 1.911E-04 1.915E-04 1.915E-04 1.912E-04 1.905E-04
RA225   2.087E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
RA226   2.146E-12 3.846E-12 1.547E-10 1.842E-10 2.174E-10 2.542E-10 2.950E-10 3.398E-10 3.890E-10
RA228   1.285E-13 2.146E-13 2.574E-12 2.839E-12 3.110E-12 3.387E-12 3.669E-12 3.955E-12 4.246E-12
AC225   2.032E-09 7.193E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
AC227   7.278E-09 1.002E-08 7.694E-08 8.496E-08 9.331E-08 1.020E-07 1.109E-07 1.202E-07 1.297E-07
AC228   5.130E-08 2.146E-13 2.574E-12 2.839E-12 3.110E-12 3.387E-12 3.669E-12 3.956E-12 4.246E-12
TH226   2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227   7.136E-09 9.900E-09 7.590E-08 8.396E-08 9.221E-08 1.008E-07 1.096E-07 1.188E-07 1.282E-07
TH228   1.967E-05 3.905E-05 1.876E-04 1.893E-04 1.904E-04 1.908E-04 1.908E-04 1.905E-04 1.898E-04
TH229   7.115E-10 7.192E-10 9.659E-10 9.993E-10 1.035E-09 1.072E-09 1.112E-09 1.154E-09 1.198E-09
TH230   3.041E-09 4.896E-09 6.451E-08 7.248E-08 8.090E-08 8.975E-08 9.904E-08 1.088E-07 1.189E-07
TH231   9.064E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
TH232   8.375E-13 1.166E-12 5.104E-12 5.432E-12 5.761E-12 6.089E-12 6.417E-12 6.745E-12 7.073E-12
TH234   2.889E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA231   8.558E-08 1.040E-07 3.236E-07 3.419E-07 3.603E-07 3.787E-07 3.971E-07 4.154E-07 4.338E-07
PA233   4.612E-03 4.736E-03 4.735E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03
PA234M  3.337E-05 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA234   3.061E-05 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09
U230   2.054E-10 1.063E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232   6.530E-05 9.812E-05 1.936E-04 1.931E-04 1.924E-04 1.914E-04 1.903E-04 1.890E-04 1.876E-04
U233   7.026E-08 9.312E-08 3.416E-07 3.645E-07 3.874E-07 4.103E-07 4.333E-07 4.562E-07 4.791E-07
U234   1.786E-04 2.335E-04 8.605E-04 9.101E-04 9.593E-04 1.008E-03 1.057E-03 1.105E-03 1.152E-03
U235   8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
U236   6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03
U237   9.421E+03 2.102E-05 1.180E-05 1.124E-05 1.072E-05 1.021E-05 9.732E-06 9.274E-06 8.838E-06
U238   2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
U240   5.196E-05 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
NP235   4.563E-05 2.408E-05 1.123E-08 5.925E-09 3.127E-09 1.650E-09 8.707E-10 4.595E-10 2.425E-10
NP236   4.940E-08 4.940E-08 4.940E-08 4.940E-08 4.940E-08 4.940E-08 4.939E-08 4.939E-08 4.939E-08
NP237   4.654E-03 4.735E-03 4.735E-03 4.735E-03 4.735E-03 4.735E-03 4.735E-03 4.735E-03 4.735E-03
NP238   2.425E+03 4.874E-07 4.614E-07 4.593E-07 4.572E-07 4.551E-07 4.531E-07 4.510E-07 4.490E-07
NP239   8.563E+01 2.298E-05 2.296E-05 2.296E-05 2.295E-05 2.295E-05 2.295E-05 2.294E-05
NP240M  1.081E-02 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
PU236   3.906E-03 3.077E-03 1.664E-04 1.305E-04 1.023E-04 8.023E-05 6.292E-05 4.934E-05 3.869E-05
PU237   9.141E-03 3.548E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238   1.931E+01 1.932E+01 1.757E+01 1.743E+01 1.729E+01 1.716E+01 1.702E+01 1.689E+01 1.676E+01
PU239   1.003E-02 1.005E-02 1.005E-02 1.005E-02 1.005E-02 1.005E-02 1.005E-02 1.005E-02 1.005E-02
PU240   7.658E-03 7.657E-03 7.649E-03 7.648E-03 7.647E-03 7.647E-03 7.646E-03 7.645E-03 7.644E-03
PU241   8.992E-01 8.570E-01 4.809E-01 4.583E-01 4.368E-01 4.163E-01 3.967E-01 3.781E-01 3.603E-01

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## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

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sbwzr2
ORIGEN2 v2.1 (8-1-91), Run on 11/17/97 at 08:27:57
      1826.0D   1.0YR   13.0YR   14.0YR   15.0YR   16.0YR   17.0YR   18.0YR   19.0YR

PU242    4.641E-06 4.641E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06
PU243    3.981E-01 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
PU244    2.246E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13
PU246    1.968E-11 1.521E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
AM241    1.053E-03 2.458E-03 1.481E-02 1.554E-02 1.623E-02 1.688E-02 1.751E-02 1.810E-02 1.866E-02
AM242M   9.791E-05 9.747E-05 9.228E-05 9.186E-05 9.148E-05 9.102E-05 9.061E-05 9.020E-05 8.979E-05
AM242    2.537E-01 9.698E-05 9.182E-05 9.140E-05 9.098E-05 9.057E-05 9.016E-05 8.975E-05 8.934E-05
AM243    2.296E-05 2.298E-05 2.296E-05 2.296E-05 2.295E-05 2.295E-05 2.295E-05 2.295E-05 2.294E-05
AM245    1.506E-07 2.178E-16 1.641E-20 7.441E-21 3.374E-21 6.529E-21 6.934E-22 3.141E-22 1.423E-22
AM246    1.968E-11 1.523E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
CM241    1.622E-08 1.432E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    1.174E-01 2.513E-02 7.593E-05 7.567E-05 7.534E-05 7.501E-05 7.467E-05 7.433E-05 7.399E-05
CM243    2.912E-05 2.842E-05 2.123E-05 2.072E-05 2.022E-05 1.973E-05 1.926E-05 1.880E-05 1.834E-05
CM244    1.315E-03 1.266E-03 7.995E-04 7.695E-04 7.406E-04 7.128E-04 6.860E-04 6.502E-04 6.354E-04
CM245    6.304E-08 6.304E-08 6.297E-08 6.297E-08 6.296E-08 6.296E-08 6.295E-08 6.295E-08 6.294E-08
CM246    6.789E-09 6.788E-09 6.776E-09 6.775E-09 6.774E-09 6.773E-09 6.772E-09 6.771E-09 6.770E-09
CM247    1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
CM248    1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14
CM249    2.21CE-10 1.540E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    2.974E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22
BK249    3.309E-11 1.502E-11 1.132E-15 5.130E-16 2.326E-16 1.055E-16 4.777E-17 2.164E-17 9.805E-18
BK250    4.778E-11 1.728E-17 3.242E-22 3.241E-22 3.241E-22 3.241E-22 3.241E-22 3.241E-22 3.241E-22
CF249    1.589E-14 6.108E-14 9.640E-14 9.621E-14 9.602E-14 9.583E-14 9.564E-14 9.545E-14 9.526E-14
CF250    3.729E-13 3.549E-13 3.879E-13 3.782E-13 3.693E-13 3.603E-13 3.520E-13 3.442E-13 3.367E-13
CF251    1.679E-15 1.678E-15 1.662E-15 1.661E-15 1.660E-15 1.658E-15 1.657E-15 1.656E-15 1.655E-15
CF252    1.729E-13 3.329E-13 5.679E-15 4.367E-15 3.358E-15 2.582E-15 1.985E-15 1.527E-15 1.174E-15
CF253    7.373E-15 4.954E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254    4.786E-17 7.900E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    6.057E-15 2.022E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    4.326E-17 1.724E-17 2.824E-22 2.824E-22 2.824E-22 2.824E-22 2.824E-22 2.824E-22 2.824E-22

H 3      5.806E+00 5.489E+00 2.799E+00 2.646E+00 2.501E+00 2.365E+00 2.236E+00 2.114E+00 1.998E+00
BE 10    4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08
C 14      1.692E-06 1.692E-06 1.689E-06 1.689E-06 1.689E-06 1.689E-06 1.689E-06 1.689E-06 1.689E-06
SE 79      6.079E-03 6.079E-03 6.078E-03 6.078E-03 6.078E-03 6.078E-03 6.078E-03 6.078E-03 6.078E-03
KR 81      8.776E-10 8.775E-10 8.776E-10 8.776E-10 8.776E-10 8.776E-10 8.776E-10 8.776E-10 8.776E-10
KR 85      1.616E+02 1.515E+02 6.972E+01 6.536E+01 6.172E+01 5.743E+01 5.383E+01 5.046E+01 4.730E+01
RB 86      1.533E+01 1.961E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87      4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07
SR 89      1.008E+04 6.701E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90      1.382E+03 1.350E+03 1.014E+03 9.905E+02 9.672E+02 9.445E+02 9.222E+02 9.006E+02 8.794E+02
Y 90       1.412E+03 1.350E+03 1.015E+03 9.908E+02 9.674E+02 9.447E+02 9.225E+02 9.008E+02 8.796E+02
Y 91       1.232E+04 1.638E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92      1.596E-08 2.405E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93      3.125E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02
NB 93M     3.505E-03 4.806E-03 6.191E-02 6.686E-02 7.175E-02 7.811E-02 8.686E-02 1.923E-02 1.975E-02
NB 94      3.100E-07 3.100E-07 3.099E-07 3.099E-07 3.099E-07 3.099E-07 3.099E-07 3.098E-07 3.098E-07
ZR 95      1.354E+04 2.589E+02 6.183E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95      1.361E+04 5.825E+02 1.373E-18 2.717E-20 2.024E-23 1.507E-26 1.122E-29 8.358E-33 6.223E-36
NB 95M     9.495E+01 1.920E+00 4.587E-21 8.771E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98      3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08
TC 99      1.950E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01
RH102     6.436E-03 5.068E-03 2.879E-04 2.267E-04 1.785E-04 1.405E-04 1.107E-04 8.713E-05 6.860E-05
RU103     6.672E+03 1.060E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M    6.012E+03 9.563E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106     8.686E+02 4.367E+02 1.139E-01 5.726E-02 2.879E-02 1.447E-02 7.277E-03 3.658E-03 1.839E-03
RH106     9.317E+02 4.367E+02 1.139E-01 5.726E-02 2.879E-02 1.447E-02 7.277E-03 3.658E-03 1.839E-03
AG106     8.517E-10 9.882E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107     2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04
AG108     7.020E-04 7.103E-10 6.653E-10 6.617E-10 6.581E-10 6.545E-10 6.509E-10 6.474E-10 6.439E-10
AG108M    8.025E-09 9.981E-09 7.475E-09 7.435E-09 7.394E-09 7.354E-09 7.314E-09 7.274E-09 7.234E-09
AG109M    1.335E+02 3.385E-07 4.853E-10 2.811E-10 1.629E-10 9.441E-11 5.471E-11 3.170E-11 1.837E-11
CD109     5.841E-07 3.385E-07 4.852E-10 2.811E-10 1.629E-10 9.441E-11 5.471E-11 3.170E-11 1.837E-11
AG110     7.834E+01 1.240E-02 6.504E-08 2.361E-08 8.574E-09 3.113E-09 1.130E-09 4.103E-10 1.490E-10
AG110M    2.567E+00 9.320E-01 4.890E-06 1.775E-06 6.446E-07 2.340E-07 8.497E-08 3.085E-08 1.120E-08
AG111     5.734E+01 1.003E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M    1.906E-01 1.818E-01 1.028E-01 9.803E-02 9.348E-02 8.915E-02 8.501E-02 8.107E-02 7.730E-02
IN114     2.417E-02 5.280E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M    9.169E-03 5.517E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M    3.097E+00 1.061E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115     6.915E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14
IN115M    3.247E+01 7.455E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M    1.450E-01 2.043E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M    6.374E-01 2.268E-01 9.351E-07 3.327E-07 1.184E-07 4.213E-08 1.499E-08 5.335E-09 1.899E-09

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwzr2
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:27:57
    1826.0D   1.0YR   13.0YR   14.0YR   15.0YR   16.0YR   17.0YR   18.0YR   19.0YR

SN121M   1.275E-03 1.257E-03 1.064E-03 1.050E-03 1.035E-03 1.021E-03 1.007E-03 9.930E-04 9.793E-04
SN123    1.212E+01 1.707E+00 1.041E-10 1.466E-11 2.065E-12 2.909E-13 4.097E-14 5.771E-15 8.128E-16
TE123    6.391E-15 7.181E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15
TE123M   2.742E-02 3.306E-03 3.122E-14 3.764E-15 4.538E-16 5.475E-17 6.579E-18 7.405E-19 1.902E-20
SB124    3.634E+00 5.418E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125    3.336E+01 1.311E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125    6.065E+01 4.747E+01 2.356E+00 1.835E+00 1.429E+00 1.112E+00 8.660E-01 6.743E-01 5.250E-01
TE125M   1.365E+01 1.157E+01 5.749E-01 4.477E-01 3.486E-01 2.714E-01 2.113E-01 1.645E-01 1.281E-01
SN126    5.393E-03 5.393E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03
SB126    3.027E+00 7.550E-04 7.549E-04 7.549E-04 7.549E-04 7.549E-04 7.549E-04 7.549E-04
SB126M   1.161E+00 5.393E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03 5.392E-03
TE127    3.401E+02 4.643E+00 3.653E-12 3.581E-13 3.510E-14 3.440E-15 3.372E-16 3.313E-17 3.247E-18
TE127M   4.660E+01 4.741E+00 3.729E-12 3.655E-13 3.583E-14 3.512E-15 3.443E-16 3.382E-17 3.280E-18
XE127    1.051E-04 1.005E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129    1.451E+03 7.477E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M   2.140E+02 1.149E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129    3.241E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04
XE129M   1.535E-02 2.768E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131    6.110E+03 1.328B-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M   6.682E+01 1.216E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132    1.420E+00 1.480E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133    1.379E+04 1.866E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134    1.455E+03 1.039E+03 1.840E+01 1.315E+01 9.395E+00 6.713E+00 4.796E+00 3.427E+00 2.449E+00
CS135    1.047E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02
CS136    4.430E+02 1.796E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M   7.300E+01 2.960E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137    1.437E+03 1.404E+03 1.064E+03 1.040E+03 1.016E+03 9.929E+02 9.703E+02 9.481E+02 9.264E+02
BA137M   1.360E+03 1.328E+03 1.007E+03 9.837E+02 9.613E+02 9.393E+02 9.179E+02 8.969E+02 8.764E+02
LA138    2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12
BA140    1.312E+04 3.318E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140    1.394E+04 3.818E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141    1.236E+04 5.160E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142    4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07
PR143    1.211E+04 1.062E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144    1.145E+04 4.700E+03 1.073E-01 4.402E-02 1.807E-02 7.415E-03 3.043E-03 1.249E-03 5.125E-04
PR144    1.149E+04 4.700E+03 1.073E-01 4.403E-02 1.807E-02 7.415E-03 3.043E-03 1.249E-03 5.125E-04
PR144M   1.375E+02 5.640E+01 1.287E-03 5.283E-04 2.168E-04 8.898E-05 3.652E-05 1.499E-05 6.150E-06
ND144    1.939E-11 2.189E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11
PM146    2.209E-02 1.947E-02 4.292E-03 3.784E-03 3.336E-03 2.941E-03 2.593E-03 2.286E-03 2.015E-03
SM146    2.861E-09 2.937E-09 3.379E-09 3.393E-09 3.407E-09 3.418E-09 3.428E-09 3.437E-09 3.445E-09
ND147    4.853E+03 5.561E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM147    1.949E+03 1.540E+03 6.465E+01 4.964E+01 3.812E+01 2.927E+01 2.247E+01 1.725E+01 1.325E+01
SM147    4.213E-08 5.355E-08 8.972E-08 9.009E-08 9.037E-08 9.059E-08 9.075E-08 9.088E-08 9.098E-08
PM148    2.092E+03 4.109E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M   3.354E+02 7.293E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148    6.979E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13
SM149    6.754E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15
EU150    3.005E-07 2.947E-07 2.339E-07 2.295E-07 2.251E-07 2.208E-07 2.166E-07 2.125E-07 2.084E-07
SM151    4.307E+00 4.307E+00 3.927E+00 3.897E+00 3.867E+00 3.837E+00 3.808E+00 3.778E+00 3.749E+00
EU152    2.107E-01 2.002E-01 1.086E-01 1.032E-01 9.809E-02 9.321E-02 8.858E-02 8.418E-02 8.000E-02
GD152    2.421E-14 2.458E-14 2.780E-14 2.799E-14 2.817E-14 2.834E-14 2.850E-14 2.865E-14 2.880E-14
GD153    1.527E-01 5.366E-02 1.896E-07 6.660E-08 2.340E-08 8.220E-09 2.888E-09 1.014E-09 3.564E-10
EU154    6.988E+01 6.447E+01 2.451E+01 2.261E+01 2.086E+01 1.925E+01 1.775E+01 1.638E+01 1.511E+01
EU155    3.712E+01 3.228E+01 6.033E+00 5.246E+00 4.562E+00 3.967E+00 3.449E+00 2.999E+00 2.608E+00
EU156    4.741E+02 2.729E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160    8.874E-01 2.676E-02 1.510E-20 1.510E-20 1.510E-20 1.510E-20 1.510E-20 1.510E-20 1.510E-20
TB161    4.131E-01 5.340E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO166M   3.309E-07 8.304E-07 8.247E-07 8.242E-07 8.237E-07 8.233E-07 8.228E-07 8.223E-07 8.218E-07
ER169    4.178E-05 8.396E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170    6.559E-06 9.158E-07 5.023E-17 7.065E-18 9.540E-19 7.335E-20 7.110E-20 6.892E-20 6.681E-20
TM171    6.258E-08 4.362E-08 5.731E-10 3.994E-10 2.784E-10 1.940E-10 1.352E-10 9.425E-11 6.569E-11

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

-1  
-1  
-1

RDA       ORIGEN2, VERSION 2.1 (8-1-91) GENERIC FUEL  
BAS       PWRU FUEL  
RDA       -1 = 1 KG FUEL  
RDA       WARNING: VECTORS ARE OFTEN CHANGED WITH RESPECT TO THEIR CONTENT.  
RDA       THESE CHANGES WILL BE NOTED ON RDA CARDS.  
CUT       -1  
LIP       0 0 0  
LIB       0 1 2 3 601 602 603 9 3 0 1 38  
TIT       INITIAL COMPOSITIONS OF UNIT AMOUNTS OF FUEL AND STRUCT MAT'L'S  
RDA       READ FUEL COMPOSITION INCLUDING IMPURITIES  
INP       -1 1 -1 -1 1 1  
TIT       IRRADIATION OF GENERIC FUEL  
MOV       -1 1 0 1.0  
HED       1    CHARGE  
BUP  
IRP      100.0   .2577   1   2   4 2  
IRP      200.0   .2577   2   3   4 0  
IRP      400.0   .2577   3   4   4 0  
IRP      600.0   .2577   4   5   4 0  
IRP      800.0   .2577   5   6   4 0  
IRP      1000.0   .2577   6   7   4 0  
IRP      1200.0   .2577   7   8   4 0  
IRP      1400.0   .2577   8   9   4 0  
IRP      1600.0   .2577   9   10   4 0  
IRP      1800.0   .2577   10   11   4 0  
IRP      1826.0   .2577   11   12   4 0  
BUP  
OPTL     8 8 8 8 8    8 8 8 8 8    8 8 8 8 8    8 8 8 8 8    8 8 8 8  
OPTA     8 8 8 8 5    8 5 8 8 8    8 8 8 8 8    8 8 8 8 8    8 8 8 8  
OPTF     8 8 8 8 8    8 5 8 8 8    8 8 8 8 8    8 8 8 8 8    8 8 8 8  
MOV      12   1 0 1.0  
DEC      1.   1 2 5 4  
DEC      20.   2 3 5 0  
DEC      21.   3 4 5 0  
DEC      22.   4 5 5 0  
DEC      23.   5 6 5 0  
DEC      24.   6 7 5 0  
DEC      25.   7 8 5 0  
DEC      26.   8 9 5 0  
OUT      -9   1 -1 0  
OUT      9   1 -1 0  
END  
2   922350   1000.0 922360   .4366   922380   8.6636    0   0.0   FUEL 97%  
0

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **                                **
echo **
copy sbwzr3.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwzr3.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\pwrus.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwzr3.u6 >nul
copy tape13.out+tape11.out sbwzr3.u11 >nul
ren tape7.out sbwzr3.pch
ren tape15.out sbwzr3.dbg
ren tape16.out sbwzr3.vxs
ren tape50.out sbwzr3.ech
rem cleanup files
del tape*.inp
del tape*.out
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```





## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

```

sbwzr3
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97      at 08:28:31
    1826.0D   1.0YR   20.0YR   21.0YR   22.0YR   23.0YR   24.0YR   25.0YR   26.0YR

SN123      1.212E+01  1.707E+00  1.145E-16  1.610E-17  2.197E-18  3.482E-19  1.117E-19  0.000E+00  0.000E+00
TE123      6.391E-15  7.181E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15
TE123M     2.742E-02  3.306E-03  1.157E-20  1.157E-20  1.157E-20  1.157E-20  1.157E-20  1.157E-20  1.157E-20
SB124      3.634E+00  5.418E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN125      3.336E+01  1.311E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB125      6.065E+01  4.747E+01  4.088E-01  3.183E-01  2.478E-01  1.930E-01  1.502E-01  1.170E-01  9.108E-02
TE125M     1.365E+01  1.157E+01  9.974E-02  7.766E-02  6.046E-02  4.708E-02  3.666E-02  2.854E-02  2.222E-02
SN126      5.393E-03  5.393E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03
SB126      3.027E+00  7.550E-04  7.549E-04  7.549E-04  7.549E-04  7.549E-04  7.549E-04  7.549E-04  7.549E-04
SB126M    1.161E+00  5.393E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03
TE127      3.401E+02  6.643E+00  3.176E-19  3.113E-20  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE127M     4.660E+01  4.741E+00  3.242E-19  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE127      1.051E-04  1.005E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129      1.451E+03  7.477E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129M     2.140E+02  7.149E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
  1129      3.241E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04
XE129M     1.535E-02  2.768E-16  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
  1131      6.110E+03  1.328E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE131M     6.682E+01  1.216E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS132      1.420E+00  1.480E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE133      1.379E+04  1.866E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS134      1.455E+03  1.039E+03  1.749E+00  1.250E+00  8.931E-01  6.381E-01  4.559E-01  3.258E-01  2.328E-01
CS135      1.047E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02
CS136      4.430E+02  1.796E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
BA136M     7.300E+01  2.960E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS137      1.437E+03  1.404E+03  9.053E+02  8.846E+02  8.644E+02  8.447E+02  8.254E+02  8.065E+02  7.881E+02
BA137M     1.360E+03  1.328E+03  8.564E+02  8.368E+02  8.177E+02  7.990E+02  7.808E+02  7.630E+02  7.455E+02
LA138      2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12
BA140      1.312E+04  3.318E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
LA140      1.394E+04  3.818E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE141      1.233E+04  5.160E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE142      4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07
PR143      1.211E+04  1.062E-04  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE144      1.145E+04  4.700E+03  2.103E-04  8.632E-05  3.542E-05  1.454E-05  5.966E-06  2.449E-06  1.005E-06
PR144      1.149E+04  4.700E+03  2.103E-04  8.632E-05  3.543E-05  1.454E-05  5.967E-06  2.449E-06  1.005E-06
PR144M     1.375E+02  5.640E+01  2.524E-06  1.036E-06  4.251E-07  1.745E-07  7.160E-08  2.938E-08  1.206E-08
ND144      1.939E-11  2.189E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11
PM146      2.209E-02  1.947E-02  1.776E-03  1.566E-03  1.381E-03  1.217E-03  1.073E-03  9.460E-04  8.340E-04
SM146      2.861E-09  2.937E-09  3.452E-09  3.458E-09  3.463E-09  3.468E-09  3.472E-09  3.476E-09  3.479E-09
ND147      4.853E+03  5.561E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM147      1.949E+03  1.540E+03  1.017E+01  7.810E+00  5.996E+00  4.604E+00  3.535E+00  2.714E+00  2.084E+00
SM147      4.213E-08  5.355E-08  9.105E-08  9.111E-08  9.116E-08  9.119E-08  9.122E-08  9.124E-08  9.125E-08
PM148      2.092E+03  4.109E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM148M     3.354E+02  7.293E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SM148      6.979E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13
SM149      6.754E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15
EU150      3.005E-07  2.947E-07  2.044E-07  2.005E-07  1.967E-07  1.930E-07  1.893E-07  1.857E-07  1.821E-07
SM151      4.307E+00  4.307E+00  3.721E+00  3.692E+00  3.664E+00  3.636E+00  3.608E+00  3.580E+00  3.553E+00
EU152      2.107E-01  2.002E-01  7.602E-02  7.224E-02  6.866E-02  6.524E-02  6.200E-02  5.892E-02  5.599E-02
GD152      2.421E-14  2.458E-14  2.894E-14  2.907E-14  2.920E-14  2.932E-14  2.943E-14  2.954E-14  2.964E-14
GD153      1.527E-01  5.366E-02  1.252E-10  4.398E-11  1.545E-11  5.428E-12  1.907E-12  6.699E-13  2.353E-13
EU154      6.988E+01  6.447E+01  1.394E+01  1.286E+01  1.187E+01  1.095E+01  1.010E+01  9.317E+00  8.596E+00
EU155      3.712E+01  3.228E+01  2.268E+00  1.972E+00  1.715E+00  1.491E+00  1.297E+00  1.128E+00  9.804E-01
EU156      4.741E+02  2.729E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB150      8.874E-01  2.676E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB151      4.131E-01  5.340E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
HO156M    8.309E-07  8.304E-07  8.214E-07  8.209E-07  8.204E-07  8.199E-07  8.195E-07  8.190E-07  8.185E-07
ER159      4.178E-05  8.396E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TM170      6.559E-06  9.158E-07  5.194E-23  5.194E-23  5.194E-23  5.194E-23  5.194E-23  5.194E-23  5.194E-23
TM171      6.258E-08  4.362E-08  4.556E-11  3.176E-11  2.213E-11  1.543E-11  1.075E-11  7.493E-12  5.222E-12

```

-1  
-1  
-1

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
RDA      ORIGEN2, VERSION 2.1 (8-1-91) GENERIC FUEL
BAS      PWRU FUEL
RDA      -1 = 1 KG FUEL
RDA      WARNING: VECTORS ARE OFTEN CHANGED WITH RESPECT TO THEIR CONTENT.
RDA          THESE CHANGES WILL BE NOTED ON RDA CARDS.
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 601 602 603 9 3 0 1 38
TIT      INITIAL COMPOSITIONS OF UNIT AMOUNTS OF FUEL AND STRUCT MAT'LS
RDA      READ FUEL COMPOSITION INCLUDING IMPURITIES
INP      -1 1 -1 -1 1 1
TIT      IRRADIATION OF GENERIC FUEL
MOV      -1 1 0 1.0
HED      1                                     CHARGE
BUP
IRP      100.0   .2577   1   2   4 2
IRP      200.0   .2577   2   3   4 0
IRP      400.0   .2577   3   4   4 0
IRP      600.0   .2577   4   5   4 0
IRP      800.0   .2577   5   6   4 0
IRP      1000.0  .2577   6   7   4 0
IRP      1200.0  .2577   7   8   4 0
IRP      1400.0  .2577   8   9   4 0
IRP      1600.0  .2577   9  10   4 0
IRP      1800.0  .2577  10  11   4 0
IRP      1826.0  .2577  11  12   4 0
BUP
OPTL     8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTA     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTF     8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
MOV      12 1 0 1.0
DEC      1. 1 2 5 4
DEC      27. 2 3 5 0
DEC      28. 3 4 5 0
DEC      29. 4 5 5 0
DEC      30. 5 6 5 0
DEC      31. 6 7 5 0
DEC      32. 7 8 5 0
DEC      33. 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922350 1000.0 922360 .4366 922380 8.6636 0 0.0 FUEL 97%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **
echo **                                O R I G E N 2
echo **
copy sbwzr4.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwzr4.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\pwrus.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwzr4.u6 >nul
copy tape13.out+tapel1.out sbwzr4.u11 >nul
ren tape7.out sbwzr4.pch
ren tape15.out sbwzr4.dbg
ren tape16.out sbwzr4.vxs
ren tape50.out sbwzr4.ech
rem cleanup files
del tape*.inp
del tape*.out
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```





**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwzr4
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:29:07
      1826.0D   1.0YR   27.0YR   28.0YR   29.0YR   30.0YR   31.0YR   32.0YR   33.0YR

SN123    1.212E+01  1.707E-00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE123    6.391E-15  7.181E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15  7.289E-15
TE123M   2.742E-02  3.306E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB124    3.634E+00  5.418E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN125    3.336E+01  1.311E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB125    6.065E+01  4.747E+01  7.096E-02  5.525E-02  4.302E-02  3.349E-02  2.608E-02  2.030E-02  1.581E-02
TE125M   1.365E+01  1.157E+01  1.731E-02  1.348E-02  1.050E-02  8.172E-03  6.363E-03  4.954E-03  3.857E-03
SN126    5.393E-03  5.393E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03
SB126    3.027E+00  7.550E-04  7.549E-04  7.548E-04  7.548E-04  7.548E-04  7.548E-04  7.548E-04  7.548E-04
SB126M   1.161E+00  5.393E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03  5.392E-03
TE127    3.401E+02  4.643E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE127M   4.660E+01  4.741E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE127    1.051E-04  1.0058E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129    1.451E+03  7.477E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129M   2.140E+02  1.149E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I129     3.241E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04  3.254E-04
XE129M   1.535E-02  2.768E-16  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I131     6.110E+03  1.328E-10  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE131M   6.682E+01  1.216E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS132    1.420E+00  1.480E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE133    1.379E+04  1.866E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS134    1.455E+03  1.039E+03  1.663E-01  1.189E-01  8.492E-02  6.068E-02  4.335E-02  3.098E-02  2.213E-02
CS135    1.047E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02  1.048E-02
CS136    4.430E+02  1.796E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
BA136M   7.300E+01  2.960E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS137    1.437E+03  1.404E+03  7.701E+02  7.525E+02  7.353E+02  7.185E+02  7.021E+02  6.861E+02  6.704E+02
BA137M   1.360E+03  1.328E+03  7.285E+02  7.119E+02  6.956E+02  6.797E+02  6.642E+02  6.490E+02  6.342E+02
LA138    2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12  2.631E-12
BA140    1.312E+04  3.318E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
LA140    1.394E+04  3.818E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE141    1.236E+04  5.160E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE142    4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07  4.183E-07
PR143    1.211E+04  1.062E-04  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE144    1.145E+04  4.700E+03  4.124E-07  1.692E-07  6.946E-08  2.850E-08  1.170E-08  4.801E-09  1.970E-09
PR144    1.149E+04  4.700E+03  4.124E-07  1.692E-07  6.946E-08  2.851E-08  1.170E-08  4.801E-09  1.970E-09
PR144M   1.375E+02  5.640E+01  4.949E-09  2.031E-09  8.335E-10  3.421E-10  1.404E-10  5.761E-11  2.364E-11
ND144    1.939E-11  2.189E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11  2.363E-11
PM146    2.209E-02  1.947E-02  7.352E-04  6.482E-04  5.714E-04  5.038E-04  4.441E-04  3.915E-04  3.452E-04
SM146    2.861E-09  2.937E-09  3.482E-09  3.485E-09  3.487E-09  3.489E-09  3.491E-09  3.492E-09  3.493E-09
ND147    4.853E+03  5.561E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PN147    1.949E+03  1.540E+03  1.598E+00  1.227E+00  9.421E-01  7.233E-01  5.554E-01  4.264E-01  3.274E-01
SN147    4.213E-08  5.355E-08  9.126E-08  9.127E-08  9.128E-08  9.129E-08  9.129E-08  9.129E-08  9.130E-08
PM148    2.092E+03  4.109E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM148M   3.354E+02  7.293E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SM148    6.979E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13  7.065E-13
SM149    6.754E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15  8.921E-15
EU150    3.005E-07  2.947E-07  1.787E-07  1.752E-07  1.719E-07  1.686E-07  1.654E-07  1.623E-07  1.592E-07
SM151    4.307E+00  4.307E+00  3.525E+00  3.498E+00  3.471E+00  3.445E+00  3.418E+00  3.392E+00  3.366E+00
EU152    2.107E-01  2.002E-01  5.321E-02  5.057E-02  4.805E-02  4.567E-02  4.340E-02  4.124E-02  3.919E-02
GD152    2.421E-14  2.458E-14  2.974E-14  2.983E-14  2.992E-14  3.001E-14  3.008E-14  3.016E-14  3.023E-14
GD153    1.527E-01  5.366E-02  8.267E-14  2.904E-14  1.020E-14  3.584E-15  1.259E-15  4.423E-16  1.554E-16
EU154    6.988E+01  6.447E+01  7.930E+00  7.316E+00  6.750E+00  6.227E+00  5.745E+00  5.300E+00  4.890E+00
EU155    3.712E+01  3.228E+01  8.526E-01  7.413E-01  6.446E-01  5.606E-01  4.874E-01  4.239E-01  3.686E-01
EU156    4.741E+02  2.729E-05  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB160    8.874E-01  2.676E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TB161    4.131E-01  5.340E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
HO166M   8.309E-07  8.304E-07  8.180E-07  8.176E-07  8.171E-07  8.166E-07  8.161E-07  8.157E-07  8.152E-07
ER169    4.178E-05  8.396E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TM170    6.559E-06  9.158E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TM171    6.258E-08  4.362E-08  3.657E-12  2.549E-12  1.777E-12  1.238E-12  8.630E-13  6.015E-13  4.192E-13

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) GENERIC FUEL
BAS      PWRU FUEL
RDA      -1 = 1 KG FUEL
RDA      WARNING: VECTORS ARE OFTEN CHANGED WITH RESPECT TO THEIR CONTENT.
RDA      THESE CHANGES WILL BE NOTED ON RDA CARDS.
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 601 602 603 9 3 0 1 38
TIT      INITIAL COMPOSITIONS OF UNIT AMOUNTS OF FUEL AND STRUCT MAT'LS
RDA      READ FUEL COMPOSITION INCLUDING IMPURITIES
INP      -1 1 -1 -1 1 1
TIT      IRRADIATION OF GENERIC FUEL
MOV      -1 1 0 1.0
HED      1                                     CHARGE
BUP
IRP      100.0   .2577   1   2   4   2
IRP      200.0   .2577   2   3   4   0
IRP      400.0   .2577   3   4   4   0
IRP      600.0   .2577   4   5   4   0
IRP      800.0   .2577   5   6   4   0
IRP      1000.0  .2577   6   7   4   0
IRP      1200.0  .2577   7   8   4   0
IRP      1400.0  .2577   8   9   4   0
IRP      1600.0  .2577   9   10  4   0
IRP      1800.0  .2577  10  11  4   0
IRP      1826.0  .2577  11  12  4   0
BUP
OPTL     8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTA     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
OPTF     8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8
MOV      12 1 0 1.0
DEC      1. 1 2 5 4
DEC      34. 2 3 5 0
DEC      35. 3 4 5 0
DEC      36. 4 5 5 0
DEC      37. 5 6 5 0
DEC      38. 6 7 5 0
DEC      39. 7 8 5 0
DEC      40. 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922350 1000.0 922360 .4366 922380 8.6636      0 0.0 FUEL 97%
0
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwzr5.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwzr5.u3 tape3.inp >nul
copy \origin2\libs\decay.lib+\origin2\libs\pwrus.lib tape9.inp >nul
copy \origin2\libs\gxuo2brm.lib tape10.inp >nul
\origin2\code\origin2
echo finished with origin2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwzr5.u6 >nul
copy tape13.out+tape11.out sbwzr5.u11 >nul
ren tape7.out sbwzr5.pch
ren tape15.out sbwzr5.dbg
ren tape16.out sbwzr5.vxs
ren tape50.out sbwzr5.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwzr5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:29:35
      1826.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

TL206    4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21
TL207    7.215E-09 1.001E-08 3.003E-07 3.140E-07 3.272E-07 3.405E-07 3.540E-07 3.677E-07 3.815E-07
TL208    6.998E-06 1.406E-05 6.043E-05 6.007E-05 5.950E-05 5.893E-05 5.836E-05 5.781E-05 5.725E-05
TL209    4.390E-11 1.554E-11 4.480E-11 4.640E-11 4.806E-11 4.975E-11 5.150E-11 5.329E-11 5.513E-11
PB209    2.037E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
PB210    6.560E-12 6.959E-12 4.198E-10 4.630E-10 5.093E-10 5.589E-10 6.118E-10 6.682E-10 7.283E-10
PB211    7.235E-09 1.004E-08 3.012E-07 3.149E-07 3.281E-07 3.415E-07 3.550E-07 3.687E-07 3.826E-07
PB212    1.948E-05 3.912E-05 1.682E-04 1.672E-04 1.656E-04 1.640E-04 1.624E-04 1.609E-04 1.593E-04
PB214    2.127E-12 3.845E-12 1.762E-09 1.904E-09 2.053E-09 2.209E-09 2.373E-09 2.544E-09 2.724E-09
BI212    5.624E-21 5.624E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21
BI210M   4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21
BI210    6.481E-12 6.963E-12 4.198E-10 4.633E-10 5.096E-10 5.592E-10 6.121E-10 6.686E-10 7.287E-10
BI211    7.235E-09 1.004E-08 3.012E-07 3.149E-07 3.281E-07 3.415E-07 3.550E-07 3.687E-07 3.826E-07
BI212    1.948E-05 3.912E-05 1.682E-04 1.672E-04 1.656E-04 1.640E-04 1.624E-04 1.609E-04 1.593E-04
BI213    2.032E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
BI214    2.127E-12 3.845E-12 1.762E-09 1.904E-09 2.053E-09 2.209E-09 2.373E-09 2.544E-09 2.724E-09
PO210    4.211E-12 6.477E-12 4.198E-10 4.385E-10 4.789E-10 5.255E-10 5.759E-10 6.298E-10 6.871E-10
PO211    2.026E-11 2.811E-11 8.433E-10 8.817E-10 9.187E-10 9.562E-10 9.941E-10 1.032E-09 1.071E-09
PO212    1.248E-05 2.506E-05 1.078E-04 1.071E-04 1.061E-04 1.051E-04 1.041E-04 1.031E-04 1.021E-04
PO213    1.988E-09 7.037E-10 2.029E-09 2.102E-09 2.177E-09 2.254E-09 2.333E-09 2.414E-09 2.497E-09
PO214    2.076E-10 3.845E-12 1.761E-09 1.903E-09 2.052E-09 2.208E-09 2.372E-09 2.544E-09 2.723E-09
PO215    7.235E-09 1.004E-08 3.012E-07 3.149E-07 3.281E-07 3.415E-07 3.550E-07 3.687E-07 3.826E-07
PO216    1.948E-05 3.912E-05 1.682E-04 1.672E-04 1.656E-04 1.640E-04 1.624E-04 1.609E-04 1.593E-04
PO218    2.127E-12 3.846E-12 1.762E-09 1.904E-09 2.053E-09 2.209E-09 2.373E-09 2.545E-09 2.724E-09
AT217    2.032E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
RN218    2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219    7.235E-09 1.004E-08 3.012E-07 3.149E-07 3.281E-07 3.415E-07 3.550E-07 3.687E-07 3.826E-07
RN220    1.948E-05 3.912E-05 1.682E-04 1.672E-04 1.656E-04 1.640E-04 1.624E-04 1.609E-04 1.593E-04
RN222    2.127E-12 3.846E-12 1.762E-09 1.904E-09 2.053E-09 2.209E-09 2.373E-09 2.545E-09 2.724E-09
FR221    2.032E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
FR223    1.004E-10 1.383E-10 4.156E-09 4.336E-09 4.518E-09 4.702E-09 4.889E-09 5.077E-09 5.258E-09
RA222    2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223    7.235E-09 1.004E-08 3.012E-07 3.149E-07 3.281E-07 3.415E-07 3.550E-07 3.687E-07 3.826E-07
RA224    1.948E-05 3.912E-05 1.682E-04 1.672E-04 1.656E-04 1.640E-04 1.624E-04 1.609E-04 1.593E-04
RA225    2.087E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
RA226    2.146E-12 3.846E-12 1.762E-09 1.904E-09 2.053E-09 2.209E-09 2.373E-09 2.545E-09 2.724E-09
RA228    1.285E-13 2.146E-13 8.897E-12 9.218E-12 9.540E-12 9.862E-12 1.019E-11 1.051E-11 1.083E-11
AC225    2.032E-09 7.193E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
AC227    7.278E-09 1.002E-08 3.012E-07 3.142E-07 3.274E-07 3.408E-07 3.543E-07 3.679E-07 3.817E-07
AC228    5.130E-08 2.146E-13 8.897E-12 9.219E-12 9.541E-12 9.863E-12 1.019E-11 1.051E-11 1.083E-11
TH226    2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227    7.136E-09 9.900E-09 2.970E-07 3.105E-07 3.236E-07 3.368E-07 3.501E-07 3.636E-07 3.773E-07
TH228    1.967E-05 3.905E-05 1.682E-04 1.666E-04 1.650E-04 1.634E-04 1.618E-04 1.603E-04 1.588E-04
TH229    7.115E-10 7.192E-10 2.074E-09 2.148E-09 2.225E-09 2.303E-09 2.384E-09 2.467E-09 2.552E-09
TH230    3.041E-09 4.896E-09 3.207E-07 3.374E-07 3.543E-07 3.717E-07 3.894E-07 4.075E-07 4.260E-07
TH231    9.064E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
TH232    8.375E-13 1.166E-12 2.200E-11 2.123E-11 2.126E-11 2.129E-11 2.131E-11 2.133E-11 2.139E-11
TH234    2.889E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA231    8.558E-08 1.040E-07 7.076E-07 7.260E-07 7.444E-07 7.627E-07 7.811E-07 7.994E-07 8.178E-07
PA233    4.612E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03
PA234M   3.337E-05 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA234    3.061E-05 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09
U230    2.054E-10 1.063E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232    6.530E-05 9.812E-05 1.637E-04 1.622E-04 1.606E-04 1.591E-04 1.576E-04 1.560E-04 1.546E-04
U233    7.026E-08 9.312E-08 7.764E-07 7.993E-07 8.223E-07 8.452E-07 8.681E-07 8.910E-07 9.139E-07
U234    1.786E-04 2.335E-04 1.824E-03 1.866E-03 1.908E-03 1.949E-03 1.990E-03 2.031E-03 2.071E-03
U235    8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
U236    6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03
U237    9.421E+03 2.102E-05 4.293E-06 4.091E-06 3.899E-06 3.716E-06 3.541E-06 3.375E-06 3.216E-06
U238    2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
U240    5.196E-05 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
NP235    4.563E-05 2.408E-05 1.662E-14 8.768E-15 4.627E-15 2.442E-15 1.288E-15 6.799E-16 3.588E-16
NP236    4.940E-08 4.940E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08
NP237    4.654E-03 4.735E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03
NP238    2.422E+03 4.874E-07 4.193E-07 4.174E-07 4.155E-07 4.136E-07 4.117E-07 4.098E-07 4.080E-07
NP239    8.563E+01 2.298E-05 2.291E-05 2.291E-05 2.291E-05 2.291E-05 2.290E-05 2.290E-05 2.290E-05
NP240M   1.081E-02 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
PU236    3.906E-03 3.077E-03 1.013E-06 7.954E-07 6.247E-07 4.908E-07 3.858E-07 3.035E-07 2.390E-07
PU237    9.141E-03 3.548E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238    1.931E+01 1.932E+01 1.488E+01 1.477E+01 1.465E+01 1.454E+01 1.442E+01 1.431E+01 1.419E+01
PU239    1.003E-02 1.005E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02
PU240    7.658E-03 7.657E-03 7.633E-03 7.632E-03 7.631E-03 7.631E-03 7.630E-03 7.629E-03 7.628E-03
PU241    8.992E-01 8.570E-01 1.750E-01 1.668E-01 1.589E-01 1.515E-01 1.444E-01 1.376E-01 1.311E-01
PU242    4.641E-06 4.641E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwzr5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:29:35
      1826.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

PU243    3.981E-01 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
PU244    2.246E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13
PU246    1.968E-11 1.521E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
AM241    1.053E-03 2.458E-03 2.431E-02 2.455E-02 2.477E-02 2.498E-02 2.517E-02 2.536E-02 2.553E-02
AM242M   9.791E-05 9.747E-05 8.385E-05 8.347E-05 8.309E-05 8.271E-05 8.234E-05 8.196E-05 8.159E-05
AM242    2.537E-01 9.698E-05 8.343E-05 8.305E-05 8.268E-05 8.230E-05 8.192E-05 8.155E-05 8.118E-05
AM243    2.296E-05 2.298E-05 2.291E-05 2.291E-05 2.291E-05 2.290E-05 2.290E-05 2.290E-05 2.290E-05
AM245    1.506E-07 2.178E-16 1.000E-27 1.000E-27 1.000E-27 1.000E-27 1.000E-27 1.000E-27 1.000E-27
AM246    1.968E-11 1.523E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
CM241    1.622E-08 1.432E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    1.174E-01 2.513E-02 6.900E-05 6.876E-05 6.846E-05 6.816E-05 6.785E-05 6.754E-05 6.723E-05
CM243    2.912E-05 2.842E-05 1.274E-05 1.243E-05 1.213E-05 1.184E-05 1.156E-05 1.128E-05 1.101E-05
CM244    1.315E-03 1.266E-03 3.579E-04 3.444E-04 3.315E-04 3.191E-04 3.071E-04 2.955E-04 2.844E-04
CM245    6.304E-08 6.304E-08 6.287E-08 6.286E-08 6.285E-08 6.285E-08 6.284E-08 6.283E-08
CM246    6.789E-09 6.788E-09 6.755E-09 6.754E-09 6.753E-09 6.752E-09 6.751E-09 6.750E-09 6.749E-09
CM247    1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
CM248    1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14
CM249    2.210E-10 1.540E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    2.974E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22
BK249    3.309E-11 1.502E-11 6.897E-23 6.897E-23 6.897E-23 6.897E-23 6.897E-23 6.897E-23 6.897E-23
BK250    4.778E-11 1.728E-17 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23
CF249    1.589E-14 6.108E-14 9.248E-14 9.229E-14 9.211E-14 9.193E-14 9.175E-14 9.157E-14 9.139E-14
CF250    3.729E-13 3.549E-13 6.176E-14 5.857E-14 5.555E-14 5.268E-14 4.996E-14 4.738E-14 4.494E-14
CF251    1.679E-15 1.678E-15 1.636E-15 1.634E-15 1.633E-15 1.632E-15 1.630E-15 1.629E-15 1.628E-15
CF252    1.729E-13 1.329E-13 2.280E-17 1.753E-17 1.347E-17 1.036E-17 7.963E-18 6.121E-18 4.706E-18
CF253    7.373E-15 4.954E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254    4.786E-17 7.900E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    6.067E-15 2.022E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    4.326E-17 1.724E-17 1.191E-30 1.191E-30 1.191E-30 1.191E-30 1.191E-30 1.191E-30 1.191E-30
H 3      5.806E+00 5.489E+00 8.610E-01 8.140E-01 7.696E-01 7.276E-01 6.879E-01 6.503E-01 6.148E-01
BE 10    4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08
C 14      1.692E-06 1.692E-06 1.685E-06 1.685E-06 1.685E-06 1.684E-06 1.684E-06 1.684E-06 1.684E-06
SE 79      6.079E-03 6.079E-03 6.077E-03 6.077E-03 6.077E-03 6.077E-03 6.076E-03 6.076E-03 6.076E-03
KR 81      8.776E-10 8.776E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10
KR 85      1.616E+02 1.515E+02 1.793E-01 1.681E-01 1.576E+01 1.477E+01 1.385E+01 1.298E+01 1.217E+01
RB 86      1.533E+01 1.961E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87      4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07
SR 89      1.006E+04 6.701E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90      1.382E+03 1.350E+03 6.153E-02 6.009E-02 5.867E+02 5.729E+02 5.595E+02 5.463E+02 5.334E+02
Y 90       1.412E+03 1.350E+03 6.155E-02 6.010E-02 5.869E+02 5.731E+02 5.596E+02 5.464E+02 5.336E+02
Y 91       1.232E+04 1.638E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92      1.596E-08 2.405E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93      3.125E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02
NB 93M     3.505E-03 4.806E-03 2.507E-02 2.530E-02 2.551E-02 2.572E-02 2.592E-02 2.611E-02 2.628E-02
NB 94      3.100E-07 3.100E-07 3.097E-07 3.097E-07 3.097E-07 3.096E-07 3.096E-07 3.096E-07 3.096E-07
ZR 95      1.354E+04 2.589E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95      1.361E+04 5.825E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M     9.495E+01 1.920E-00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98      3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08
TC 99      1.950E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01
RH102     6.436E-03 5.068E-03 1.902E-06 1.498E-06 1.179E-06 9.287E-07 7.313E-07 5.758E-07 4.534E-07
RU103     6.672E-03 1.060E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M    6.012E+03 9.560E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106     8.686E-02 4.367E+02 6.096E-08 3.065E-08 1.541E-08 7.746E-09 3.895E-09 1.958E-09 9.844E-10
RH106     9.317E+02 4.367E+02 6.096E-08 3.065E-08 1.541E-08 7.746E-09 3.895E-09 1.958E-09 9.844E-10
AG106     8.517E-10 9.882E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
FD107     2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04
AG108     7.020E-04 7.103E-10 5.933E-10 5.900E-10 5.868E-10 5.836E-10 5.804E-10 5.773E-10 5.741E-10
AG108M    8.025E-09 7.981E-09 6.566E-09 6.630E-09 6.593E-09 6.558E-09 6.522E-09 6.486E-09 6.451E-09
AG109M    1.335E+02 3.385E-07 5.126E-15 2.971E-15 1.721E-15 9.975E-16 5.780E-16 3.350E-16 1.941E-16
CD109     5.841E-07 3.385E-07 5.126E-15 2.971E-15 1.721E-15 9.975E-16 5.780E-16 3.349E-16 1.941E-16
AG110     7.834E+01 1.240E-02 3.741E-17 1.358E-17 4.932E-18 1.790E-18 6.503E-19 2.362E-19 8.577E-20
AG110M    2.567E+00 9.320E-01 2.813E-15 1.021E-15 3.708E-16 1.346E-16 4.890E-17 1.776E-17 6.426E-18
AG111     5.734E+01 1.003E-13 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M    1.906E-01 1.818E-01 3.790E-02 3.615E-02 3.447E-02 3.287E-02 3.134E-02 2.989E-02 2.850E-02
IN114     2.417E-02 5.290E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M    9.169E-03 5.517E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M    3.097E+00 1.061E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115     6.915E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14
IN115M    3.247E+01 7.455E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M    1.450E-01 2.043E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M    6.374E-01 2.268E-01 3.527E-16 1.255E-16 4.468E-17 1.591E-17 5.638E-18 1.998E-18 7.276E-19
SN121M    1.275E-03 1.257E-03 7.953E-04 7.844E-04 7.736E-04 7.629E-04 7.524E-04 7.318E-04

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwzr5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:29:35
    1826.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

SN123   1.212E+01 1.707E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE123   6.391E-15 7.181E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15
TE123M  2.742E-02 3.306E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB124   3.634E+00 5.418E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125   3.336E+01 1.311E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125   6.065E+01 4.747E+01 1.230E-02 9.578E-03 7.458E-03 5.807E-03 4.521E-03 3.520E-03 2.741E-03
TE125M  1.365E+01 1.157E+01 3.001E-03 2.337E-03 1.820E-03 1.417E-03 1.103E-03 8.589E-04 6.687E-04
SN126   5.393E-03 5.393E-03 5.392E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03
SB126   3.027E+00 7.550E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04
SB126M  1.161E+00 5.393E-03 5.392E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03
TE127   3.401E+02 4.643E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE127M  4.660E+01 4.741E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE127   1.051E-04 1.005E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129   1.451E+03 7.477E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M  2.140E+02 1.149E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129    3.241E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04
XE129M  1.535E-02 2.768E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131    6.110E+03 1.328E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M  6.682E+01 1.216E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132   1.420E+00 1.480E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133   1.379E+04 1.866E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134   1.455E+03 1.039E-03 1.581E-02 1.130E-02 8.073E-03 5.768E-03 4.122E-03 2.945E-03 2.104E-03
CS135   1.047E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02
CS136   4.430E+02 1.796E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M  7.300E+01 2.960E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137   1.437E+03 1.404E-03 6.551E+02 6.401E+02 6.255E+02 6.112E+02 5.973E+02 5.836E+02 5.703E+02
BA137M  1.360E+03 1.328E+03 6.197E+02 6.056E+02 5.917E+02 5.782E+02 5.650E+02 5.521E+02 5.395E+02
LA138   2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12
BA140    1.312E+04 3.318E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140    1.394E+04 3.818E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141    1.236E+04 5.160E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142    4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07
PR143    1.211E+04 1.062E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144    1.145E+04 4.700E+03 8.086E-10 3.318E-10 1.362E-10 5.589E-11 2.294E-11 9.413E-12 3.863E-12
PR144    1.149E+04 4.700E+03 8.086E-10 3.318E-10 1.362E-10 5.589E-11 2.294E-11 9.413E-12 3.863E-12
PR144M   1.375E+02 5.640E+01 9.703E-12 3.982E-12 1.634E-12 6.707E-13 2.752E-13 1.130E-13 4.636E-14
ND144    1.939E-11 2.189E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11
PM146    2.209E-02 1.947E-02 3.043E-04 2.683E-04 2.365E-04 2.085E-04 1.838E-04 1.620E-04 1.429E-04
SM146    2.861E-09 2.937E-09 3.495E-09 3.496E-09 3.497E-09 3.497E-09 3.498E-09 3.499E-09 3.499E-09
ND147    4.853E+03 5.561E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM147    1.949E+03 1.540E+03 2.517E-01 1.933E-01 1.484E-01 1.139E-01 8.749E-02 6.718E-02 5.158E-02
SM147    4.213E-08 5.355E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08
PM148    2.092E+03 4.109E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M   3.354E+02 7.293E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148    6.979E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13
SM149    6.754E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15
EU150    3.005E-07 2.947E-07 1.561E-07 1.532E-07 1.502E-07 1.474E-07 1.446E-07 1.418E-07 1.391E-07
SM151    4.307E+00 4.307E+00 3.340E+00 3.315E+00 3.289E+00 3.264E+00 3.239E+00 3.214E+00 3.189E+00
EU152    2.107E-01 2.002E-01 3.725E-02 3.539E-02 3.364E-02 3.196E-02 3.038E-02 2.887E-02 2.743E-02
GD152    2.421E-14 2.458E-14 3.030E-14 3.037E-14 3.043E-14 3.049E-14 3.054E-14 3.059E-14 3.065E-14
GD153    1.527E-01 5.366E-02 5.459E-17 1.919E-17 6.712E-18 2.347E-18 8.454E-19 2.623E-19 1.314E-19
EU154    6.988E+01 6.447E+01 4.511E+00 4.162E+00 3.839E+00 3.542E+00 3.268E+00 3.015E+00 2.781E+00
EU155    3.712E+01 3.228E+01 3.205E-01 2.787E-01 2.423E-01 2.107E-01 1.832E-01 1.593E-01 1.386E-01
EU156    4.741E+02 2.729E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160    8.874E-01 2.676E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB161    4.131E-01 5.340E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO166M   8.309E-07 8.304E-07 8.147E-07 8.143E-07 8.138E-07 8.133E-07 8.129E-07 8.124E-07 8.119E-07
ER169    4.178E-05 8.396E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170    6.559E-06 9.158E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM171    6.258E-08 4.362E-08 2.922E-13 2.036E-13 1.419E-13 9.892E-14 6.895E-14 4.805E-14 3.349E-14

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) GENERIC FUEL
BAS      PWRU FUEL
RDA      -1 = 1 KG FUEL
RDA      WARNING: VECTORS ARE OFTEN CHANGED WITH RESPECT TO THEIR CONTENT.
RDA      THESE CHANGES WILL BE NOTED ON RDA CARDS.
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 601 602 603 9 3 0 1 38
TIT      INITIAL COMPOSITIONS OF UNIT AMOUNTS OF FUEL AND STRUCT MAT'LS
RDA      READ FUEL COMPOSITION INCLUDING IMPURITIES
INP      -1 1 -1 -1 1 1
TIT      IRRADIATION OF GENERIC FUEL
MOV      -1 1 0 1.0
HED      1
BUP
IRP      100.0   .2577   1   2   4 2
IRP      200.0   .2577   2   3   4 0
IRP      400.0   .2577   3   4   4 0
IRP      600.0   .2577   4   5   4 0
IRP      800.0   .2577   5   6   4 0
IRP      1000.0  .2577   6   7   4 0
IRP      1200.0  .2577   7   8   4 0
IRP      1400.0  .2577   8   9   4 0
IRP      1600.0  .2577   9  10   4 0
IRP      1800.0  .2577  10  11   4 0
IRP      1826.0  .2577  11  12   4 0
BUP
OPTL     8 8 8 8 8   8 8 8 8 8   8 8 8 8 8   8 8 8 8 8
OPTA     8 8 8 8 5   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8
OPTF     8 8 8 8 8   8 5 8 8 8   8 8 8 8 8   8 8 8 8 8
MOV      12 1 0 1.0
DEC      1. 1 2 5 4
DEC      41. 2 3 5 0
DEC      42. 3 4 5 0
DEC      43. 4 5 5 0
DEC      44. 5 6 5 0
DEC      45. 6 7 5 0
DEC      46. 7 8 5 0
DEC      47. 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922350 1000.0 922360 .4366 922380 8.6636 0 0.0 FUEL 97%
0

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwzr6.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwzr6.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\pwrus.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwzr6.u6 >nul
copy tape13.out+tape11.out sbwzr6.u11 >nul
ren tape7.out sbwzr6.pch
ren tape15.out sbwzr6.dbg
ren tape16.out sbwzr6.vxs
ren tape50.out sbwzr6.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sdwzr6
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:30:04
1826.0D 1.0YR 41.0YR 42.0YR 43.0YR 44.0YR 45.0YR 46.0YR 47.0YR

TL206 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21 4.844E-21
TL207 7.215E-09 1.001E-08 3.945E-07 4.094E-07 4.237E-07 4.380E-07 4.524E-07 4.670E-07 4.817E-07
TL208 6.998E-06 1.406E-05 5.650E-05 5.617E-05 5.563E-05 5.510E-05 5.457E-05 5.405E-05 5.353E-05
TL209 4.390E-11 1.554E-11 5.690E-11 5.880E-11 6.075E-11 6.274E-11 6.478E-11 6.687E-11 6.900E-11
PB209 2.037E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
PB210 6.560E-12 6.959E-12 7.924E-10 8.601E-10 9.319E-10 1.008E-09 1.088E-09 1.173E-09 1.262E-09
PB211 7.235E-09 1.004E-08 3.956E-07 4.106E-07 4.248E-07 4.392E-07 4.537E-07 4.683E-07 4.831E-07
PB212 1.948E-05 3.912E-05 1.573E-04 1.563E-04 1.548E-04 1.533E-04 1.519E-04 1.504E-04 1.490E-04
PB214 2.127E-12 3.845E-12 2.911E-09 3.106E-09 3.310E-09 3.522E-09 3.743E-09 3.973E-09 4.211E-09
BZ208 5.624E-21 5.624E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21 5.623E-21
BZ210M 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21 4.863E-21
BZ210 6.481E-12 6.963E-12 7.924E-10 8.606E-10 9.324E-10 1.008E-09 1.089E-09 1.173E-09 1.263E-09
BZ211 7.235E-09 1.004E-08 3.956E-07 4.106E-07 4.248E-07 4.392E-07 4.537E-07 4.683E-07 4.831E-07
BZ212 1.948E-05 3.912E-05 1.573E-04 1.563E-04 1.548E-04 1.533E-04 1.519E-04 1.504E-04 1.490E-04
BZ213 2.032E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
BZ214 2.127E-12 3.845E-12 2.911E-09 3.106E-09 3.310E-09 3.522E-09 3.743E-09 3.973E-09 4.211E-09
PO210 4.211E-12 6.477E-12 7.924E-10 8.203E-10 8.831E-10 9.549E-10 1.032E-09 1.113E-09 1.199E-09
PO211 2.026E-11 2.811E-11 1.108E-09 1.150E-09 1.190E-09 1.230E-09 1.270E-09 1.311E-09 1.353E-09
PO212 1.248E-05 2.506E-05 1.008E-04 1.002E-04 9.920E-05 9.825E-05 9.731E-05 9.637E-05 9.545E-05
PO213 1.988E-09 7.037E-10 2.578E-09 2.664E-09 2.752E-09 2.842E-09 2.934E-09 3.029E-09 3.125E-09
PO214 2.076E-10 3.845E-12 2.910E-09 3.106E-09 3.309E-09 3.522E-09 3.743E-09 3.972E-09 4.210E-09
PO215 7.235E-09 1.004E-08 3.956E-07 4.106E-07 4.248E-07 4.392E-07 4.537E-07 4.683E-07 4.831E-07
PO216 1.948E-05 3.912E-05 1.573E-04 1.563E-04 1.548E-04 1.533E-04 1.519E-04 1.504E-04 1.490E-04
PO218 2.127E-12 3.846E-12 2.911E-09 3.107E-09 3.311E-09 3.523E-09 3.744E-09 3.974E-09 4.212E-09
AT217 2.032E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
RN218 2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219 7.235E-09 1.004E-08 3.956E-07 4.106E-07 4.248E-07 4.392E-07 4.537E-07 4.683E-07 4.831E-07
RN220 1.948E-05 3.912E-05 1.573E-04 1.563E-04 1.548E-04 1.533E-04 1.519E-04 1.504E-04 1.490E-04
RN222 2.127E-12 3.846E-12 2.911E-09 3.107E-09 3.311E-09 3.523E-09 3.744E-09 3.974E-09 4.212E-09
FR221 2.032E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
FR223 1.004E-10 1.383E-10 5.460E-09 5.654E-09 5.850E-09 6.048E-09 6.248E-09 6.449E-09 6.652E-09
RA222 2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223 7.235E-09 1.004E-08 3.956E-07 4.106E-07 4.248E-07 4.392E-07 4.537E-07 4.683E-07 4.831E-07
RA224 1.948E-05 3.912E-05 1.573E-04 1.563E-04 1.548E-04 1.533E-04 1.519E-04 1.504E-04 1.490E-04
RA225 2.087E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
RA226 2.146E-12 3.846E-12 2.911E-09 3.107E-09 3.311E-09 3.523E-09 3.744E-09 3.974E-09 4.212E-09
RA228 1.285E-13 2.146E-13 1.116E-11 1.148E-11 1.181E-11 1.213E-11 1.246E-11 1.278E-11 1.311E-11
AC225 2.032E-09 7.193E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
AC227 7.278E-09 1.002E-08 3.956E-07 4.097E-07 4.239E-07 4.383E-07 4.527E-07 4.673E-07 4.820E-07
AC228 5.130E-08 2.146E-13 1.116E-11 1.148E-11 1.181E-11 1.213E-11 1.246E-11 1.278E-11 1.311E-11
TH226 2.055E-10 1.064E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227 7.136E-09 9.900E-09 3.902E-07 4.049E-07 4.190E-07 4.332E-07 4.475E-07 4.619E-07 4.764E-07
TH228 1.967E-05 3.905E-05 1.573E-04 1.557E-04 1.543E-04 1.528E-04 1.513E-04 1.499E-04 1.484E-04
TH229 7.115E-10 7.192E-10 2.634E-09 2.722E-09 2.812E-09 2.905E-09 2.999E-09 3.096E-09 3.194E-09
TH230 3.041E-09 4.896E-09 4.448E-07 4.640E-07 4.835E-07 5.034E-07 5.237E-07 5.442E-07 5.652E-07
TH231 9.064E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
TH232 8.375E-13 1.166E-12 1.429E-11 1.462E-11 1.495E-11 1.528E-11 1.561E-11 1.593E-11 1.626E-11
TH234 2.889E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA231 8.558E-08 1.040E-07 8.356E-07 8.540E-07 8.723E-07 8.907E-07 9.091E-07 9.274E-07 9.458E-07
PA233 4.612E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03
PA234M 3.337E-05 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
PA234 3.061E-05 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09 3.744E-09
U230 2.054E-10 1.063E-15 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232 6.530E-05 9.812E-05 1.531E-04 1.516E-04 1.502E-04 1.487E-04 1.473E-04 1.459E-04 1.445E-04
U233 7.026E-08 9.312E-08 9.214E-07 9.443E-07 9.672E-07 9.901E-07 1.013E-06 1.036E-06 1.059E-06
U234 1.786E-04 2.335E-04 2.111E-03 2.151E-03 2.191E-03 2.230E-03 2.269E-03 2.307E-03 2.345E-03
U235 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04 8.650E-04
U236 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03 6.653E-03
U237 9.421E+03 2.102E-05 3.065E-06 2.921E-06 2.784E-06 2.653E-06 2.528E-06 2.409E-06 2.296E-06
U238 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06 2.880E-06
U240 5.196E-05 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
NP235 4.563E-05 2.408E-05 1.893E-16 9.990E-17 5.271E-17 2.781E-17 1.470E-17 7.768E-18 4.105E-18
NP236 4.940E-08 4.940E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08 4.939E-08
NP237 4.654E-03 4.735E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03 4.736E-03
NP238 2.125E+03 4.874E-07 4.061E-07 4.043E-07 4.024E-07 4.006E-07 3.988E-07 3.969E-07 3.951E-07
NP239 8.563E+01 2.298E-05 2.290E-05 2.290E-05 2.289E-05 2.289E-05 2.289E-05 2.289E-05 2.288E-05
NP240M 1.081E-02 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13 2.244E-13
PU236 3.906E-03 3.077E-03 1.884E-07 1.487E-07 1.175E-07 9.313E-08 7.399E-08 5.898E-08 4.721E-08
PU237 9.141E-03 3.548E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238 1.931E+01 1.932E+01 1.408E+01 1.397E+01 1.386E+01 1.375E+01 1.364E+01 1.354E+01 1.343E+01
PU239 1.003E-02 1.005E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02 1.004E-02
PU240 7.658E-03 7.657E-03 7.628E-03 7.627E-03 7.626E-03 7.625E-03 7.624E-03 7.624E-03 7.623E-03
PU241 8.992E-01 8.570E-01 1.249E-01 1.191E-01 1.135E-01 1.081E-01 1.031E-01 9.822E-02 9.360E-02
PU242 4.641E-06 4.641E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06 4.642E-06

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## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

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sbwzr6
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:30:04
    1826.0D    1.0YR   41.0YR   42.0YR   43.0YR   44.0YR   45.0YR   46.0YR   47.0YR

PU243    3.981E-01 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
PU244    2.246E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13 2.247E-13
PU245    1.968E-11 1.521E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
AM241    1.053E-03 2.458E-03 2.570E-02 2.585E-02 2.600E-02 2.613E-02 2.626E-02 2.638E-02 2.649E-02
AM242M   9.791E-05 9.747E-05 8.122E-05 8.085E-05 8.048E-05 8.011E-05 7.975E-05 7.939E-05 7.902E-05
AM242    2.537E-01 9.698E-05 8.081E-05 8.044E-05 8.008E-05 7.971E-05 7.935E-05 7.899E-05 7.863E-05
AM243    2.296E-05 2.298E-05 2.290E-05 2.289E-05 2.289E-05 2.289E-05 2.289E-05 2.289E-05 2.288E-05
AM245    1.506E-07 2.178E-16 3.937E-30 3.947E-30 3.947E-30 3.947E-30 3.947E-30 3.947E-30 3.947E-30
AM246    1.968E-11 1.523E-21 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23 7.443E-23
CM241    1.622E-08 1.432E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    1.174E-01 2.513E-02 6.683E-05 6.660E-05 6.631E-05 6.602E-05 6.572E-05 6.542E-05 6.512E-05
CM243    2.912E-05 2.842E-05 1.074E-05 1.049E-05 1.023E-05 9.987E-06 9.747E-06 9.513E-06 9.285E-06
CM244    1.315E-03 1.266E-03 2.738E-04 2.635E-04 2.536E-04 2.441E-04 2.349E-04 2.261E-04 2.176E-04
CM245    6.304E-08 6.304E-08 6.283E-08 6.282E-08 6.281E-08 6.281E-08 6.280E-08 6.280E-08 6.280E-08
CM246    6.789E-09 6.788E-09 6.748E-09 6.747E-09 6.746E-09 6.745E-09 6.744E-09 6.743E-09 6.742E-09
CM247    1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14 1.067E-14
CM248    1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14 1.464E-14
CM249    2.210E-10 1.540E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM250    2.974E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22 2.977E-22
BK249    3.309E-11 1.502E-11 2.714E-25 2.714E-25 2.714E-25 2.714E-25 2.714E-25 2.714E-25 2.714E-25
BK250    4.778E-11 1.728E-17 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23 4.168E-23
CF249    1.589E-14 6.108E-14 9.121E-14 9.102E-14 9.085E-14 9.067E-14 9.049E-14 9.031E-14 9.013E-14
CF250    3.729E-13 3.549E-13 4.262E-14 4.042E-14 3.833E-14 3.635E-14 3.448E-14 3.270E-14 3.101E-14
CF251    1.679E-15 1.678E-15 1.627E-15 1.625E-15 1.624E-15 1.623E-15 1.622E-15 1.620E-15 1.619E-15
CF252    1.729E-13 1.329E-13 3.624E-18 2.797E-18 2.158E-18 1.666E-18 1.286E-18 9.922E-19 7.657E-19
CF253    7.373E-15 4.954E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CF254    4.786E-17 7.900E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES253    6.067E-15 2.022E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ES254    4.326E-17 1.724E-17 1.924E-33 1.924E-33 1.924E-33 1.924E-33 1.924E-33 1.924E-33 1.924E-33
H  3      5.806E+00 5.489E+00 5.813E-01 5.495E-01 5.196E-01 5.912E-01 4.644E-01 4.390E-01 4.151E-01
BE 10     4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08 4.196E-08
C  14     1.692E-06 1.692E-06 1.684E-06 1.683E-06 1.683E-06 1.683E-06 1.683E-06 1.683E-06 1.682E-06
SE 79     6.079E-03 6.079E-03 6.076E-03 6.076E-03 6.076E-03 6.076E-03 6.076E-03 6.076E-03 6.076E-03
KR 81     8.776E-10 8.776E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10 8.775E-10
KR 85     1.616E+02 1.515E+02 1.141E+01 1.069E+01 1.002E+01 9.394E+00 8.806E+00 8.255E+00 7.738E+00
RB 86     1.533E+01 1.961E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87     4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07 4.092E-07
SR 89     1.008E+04 6.701E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90     1.382E+03 1.350E+03 5.209E+02 5.086E+02 4.967E+02 4.850E+02 4.736E+02 4.625E+02 4.516E+02
Y  90      1.412E+03 1.350E+03 5.210E+02 5.088E+02 4.968E+02 4.851E+02 4.737E+02 4.626E+02 4.517E+02
Y  91      1.232E+04 1.638E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92     1.596E-08 2.405E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93     3.125E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02 3.126E-02
NB 93M    3.505E-03 4.806E-03 2.645E-02 2.662E-02 2.677E-02 2.691E-02 2.705E-02 2.718E-02 2.731E-02
NB 94     3.100E-07 3.100E-07 3.096E-07 3.096E-07 3.096E-07 3.096E-07 3.096E-07 3.095E-07 3.095E-07
ZRS 95    1.354E+04 2.589E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95     1.361E+04 5.825E+02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M    9.495E+01 1.920E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98     3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08 3.974E-08
TC 99     1.950E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01 1.955E-01
RH102    6.436E-03 5.068E-03 3.570E-07 2.811E-07 2.213E-07 1.743E-07 1.372E-07 1.081E-07 8.509E-08
RU103    6.672E+03 1.060E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M   6.012E+03 9.560E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106    8.686E+02 4.367E+02 4.949E-10 2.488E-10 1.251E-10 6.289E-11 3.162E-11 1.590E-11 7.993E-12
RH106    9.317E+02 4.367E+02 4.949E-10 2.488E-10 1.251E-10 6.289E-11 3.162E-11 1.590E-11 7.993E-12
AG106    8.517E-10 9.882E-23 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107    2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04 2.178E-04
AG108    7.020E-04 7.103E-10 5.710E-10 5.679E-10 5.648E-10 5.618E-10 5.587E-10 5.557E-10 5.525E-10
AG108M   8.025E-09 7.981E-09 6.416E-09 6.381E-09 6.346E-09 6.312E-09 6.277E-09 6.243E-09 6.209E-09
AG109M   1.335E+02 3.385E-07 1.125E-16 5.518E-17 3.779E-17 2.191E-17 2.271E-17 2.368E-18 4.270E-18
CD109    5.841E-07 3.385E-07 1.125E-16 5.517E-17 3.779E-17 2.191E-17 2.271E-17 2.368E-18 4.245E-18
AG110    7.834E+01 1.240E-02 3.111E-20 1.153E-20 4.187E-21 1.884E-21 9.424E-22 3.421E-22 0.000E+00
AG110M   2.567E+00 9.320E-01 2.339E-18 8.671E-19 2.833E-19 1.417E-19 7.086E-20 0.000E+00 0.000E+00
AG111    5.734E+01 1.003E-13 0.000E+00 0.000E-00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M   1.906E-01 1.818E-01 2.718E-02 2.592E-02 2.472E-02 2.357E-02 2.248E-02 2.143E-02 2.044E-02
IN114    2.417E-02 5.280E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M   9.169E-03 5.517E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M   3.097E-00 1.061E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115    6.915E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14 7.032E-14
IN115M   3.247E+01 7.455E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M   1.450E-01 2.043E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M   6.374E-01 2.268E-01 2.548E-19 1.275E-19 6.384E-20 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN121M   1.275E-03 1.257E-03 7.217E-04 7.118E-04 7.020E-04 6.923E-04 6.828E-04 6.734E-04 6.641E-04

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwzr6
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:30:04
      1826.0D   1.0YR   41.0YR   42.0YR   43.0YR   44.0YR   45.0YR   46.0YR   47.0YR

SN123    1.212E+01 1.707E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE123    6.391E-15 7.181E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15 7.289E-15
TE123M   2.742E-02 3.306E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB124    3.634E+00 5.418E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125    3.336E+01 1.311E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125    6.065E+01 4.747E+01 2.134E-03 1.662E-03 1.294E-03 1.007E-03 7.843E-04 6.107E-04 4.755E-04
TE125M   1.365E+01 1.157E+01 5.207E-04 4.054E-04 3.156E-04 2.458E-04 1.914E-04 1.490E-04 1.160E-04
SN126    5.393E-03 5.393E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03
SB126    3.027E+00 7.550E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04 7.548E-04 7.547E-04
SB126M   1.161E+00 5.393E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03 5.391E-03
TE127    3.401E+02 4.643E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE127M   4.660E+01 4.741E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE127    1.051E-04 1.005E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129    1.451E+03 7.477E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M   2.140E+02 1.149E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
II129   3.241E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04 3.254E-04
XE129M   1.535E-02 2.768E-16 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
II131    6.110E+03 1.328E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M   6.682E+01 1.216E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132    1.420E+00 1.480E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133    1.379E+04 1.866E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134    1.455E+03 1.039E+03 1.503E-03 1.074E-03 7.675E-04 5.484E-04 3.918E-04 2.800E-04 2.000E-04
CS135    1.047E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02 1.048E-02
CS136    4.430E+02 1.796E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M   7.300E+01 2.960E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137    1.437E+03 1.404E+03 5.573E+02 5.445E+02 5.321E+02 5.199E+02 5.081E+02 4.965E+02 4.851E+02
BA137M   1.360E+03 1.328E+03 5.272E+02 5.151E+02 5.034E+02 4.919E+02 4.806E+02 4.696E+02 4.589E+02
LA138    2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12 2.631E-12
BA140    1.312E+04 3.318E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140    1.394E+04 3.818E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141    1.236E+04 5.160E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142    4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07 4.183E-07
PR143    1.211E+04 1.062E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144    1.145E+04 4.700E+03 1.585E-12 6.506E-13 2.670E-13 1.096E-13 4.497E-14 1.846E-14 7.574E-15
PR144    1.149E+04 4.700E+03 1.585E-12 6.506E-13 2.670E-13 1.096E-13 4.497E-14 1.846E-14 7.574E-15
PR144M   1.375E+02 5.640E+01 1.902E-14 7.808E-15 3.204E-15 1.315E-15 5.397E-16 2.215E-16 9.089E-17
ND144    1.939E-11 2.189E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11 2.363E-11
PM146    2.209E-02 1.947E-02 1.259E-04 1.110E-04 9.788E-05 8.629E-05 7.607E-05 6.706E-05 5.912E-05
SM146    2.861E-09 2.937E-09 3.500E-09 3.500E-09 3.501E-09 3.501E-09 3.501E-09 3.502E-09 3.502E-09
ND147    4.853E+03 5.561E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM147    1.949E+03 1.540E+03 3.960E-02 3.041E-02 2.335E-02 1.793E-02 1.376E-02 1.057E-02 8.114E-03
SM147    4.213E-08 5.355E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08 9.130E-08
PM148    2.092E+03 4.109E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M   3.354E+02 7.293E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148    6.979E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13 7.065E-13
SM149    6.754E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15 8.921E-15
EU150    3.005E-07 2.947E-07 1.364E-07 1.338E-07 1.313E-07 1.288E-07 1.263E-07 1.239E-07 1.216E-07
SM151    4.307E+00 4.307E+00 3.165E+00 3.141E+00 3.117E+00 3.093E+00 3.069E+00 3.045E+00 3.022E+00
EU152    2.107E-01 2.002E-01 2.607E-02 2.477E-02 2.354E-02 2.237E-02 2.126E-02 2.021E-02 1.920E-02
GD152    2.421E-14 2.458E-14 3.069E-14 3.074E-14 3.078E-14 3.082E-14 3.086E-14 3.090E-14 3.093E-14
GD153    1.527E-01 5.366E-02 3.605E-20 3.605E-20 3.605E-20 3.605E-20 3.605E-20 3.605E-20 3.605E-20
EU154    6.988E+01 6.447E-01 2.566E+00 2.367E+00 2.184E+00 2.015E+00 1.859E+00 1.715E+00 1.582E+00
EU155    3.712E+01 3.228E-01 1.205E-01 1.048E-01 9.110E-02 7.922E-02 6.888E-02 5.990E-02 5.209E-02
EU156    4.741E+02 2.729E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160    8.874E-01 2.676E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB161    4.131E-01 5.340E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO166M   8.309E-07 8.304E-07 8.114E-07 8.110E-07 8.105E-07 8.100E-07 8.096E-07 8.091E-07 8.086E-07
ER169    4.178E-05 8.396E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170    6.559E-06 9.158E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM171    6.258E-08 4.362E-08 2.334E-14 1.627E-14 1.134E-14 7.903E-15 5.508E-15 3.839E-15 2.676E-15

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) EBR-II
BAS      ONE ELEMENT
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 381 382 383 9 50 0 4 0
TIT      ONE CYCLE FOR ONE EBR-II ELEMENT
INP      -1 1 -1 -1 1 1
MOV      -1 1 0 1.0
HED      1
BUP
IRP      50.0 .01068 1 2 4 2
IRP      100.0 .01068 2 3 4 0
IRP      200.0 .01068 3 4 4 0
IRP      250.0 .01068 4 5 4 0
IRP      300.0 .01068 5 6 4 0
IRP      345.0 .01068 6 7 4 0
BUP
OPTL     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8
MOV      7 1 0 1.0
DEC      1. 1 2 5 4
DEC      20. 2 3 5 0
DEC      21. 3 4 5 0
DEC      22. 4 5 5 0
DEC      23. 5 6 5 0
DEC      24. 6 7 5 0
DEC      25. 7 8 5 0
DEC      26. 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922340 1.04E-2 922350 33.6 922360 5.10E-2 922380 30.34 FUEL 52.5%
1 60120 5.64E-3 60130 6.27E-5 140280 1.75E-1 140290 8.87E-3
1 140300 5.89E-3 150310 8.55E-3 160320 5.42E-3 160330 4.28E-5
1 160340 2.40E-4 160350 1.14E-6 160540 7.61E-1 240500 1.57E-1
1 240520 3.02E+0 240530 3.43E-1 240540 8.54E-2 250240 3.00E-1
1 250250 3.80E-2 250260 4.18E-2 260560 1.183E+1 260570 2.71E-1
1 260580 3.61E-2 410930 1.90E+00 0 0. 0 0.
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwss2.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwss2.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\fftfc.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem combine and save files from run
copy tape12.out+tape6.out sbwss2.u6 >nul
copy tape13.out+tape11.out sbwss2.u11 >nul
ren tape7.out sbwss2.pch
ren tape15.out sbwss2.dbg
ren tape16.out sbwss2.vxs
ren tape50.out sbwss2.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwss3
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:08
      345.0D    1.0YR   20.0YR   21.0YR   22.0YR   23.0YR   24.0YR   25.0YR   26.0YR

H 3      1.532E-09 1.449E-09 4.986E-10 4.714E-10 4.457E-10 4.213E-10 3.983E-10 3.766E-10 3.560E-10
BE 10    3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11
C 14      3.500E-11 3.499E-11 3.491E-11 3.491E-11 3.490E-11 3.490E-11 3.489E-11 3.489E-11 3.489E-11
NA 22    3.050E-16 2.337E-16 1.471E-18 1.131E-18 8.702E-19 6.692E-19 5.147E-19 3.958E-19 3.044E-19
SI 32      5.062E-13 5.056E-13 4.955E-13 4.949E-13 4.944E-13 4.939E-13 4.934E-13 4.928E-13 4.923E-13
P 32      7.091E-02 1.452E-09 4.955E-13 4.950E-13 4.944E-13 4.939E-13 4.934E-13 4.929E-13 4.923E-13
P 33      5.987E-08 2.394E-12 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
S 35      3.232E-03 1.820E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CL 36      3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11
AR 37      2.425E-15 1.759E-18 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
AR 39      1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22
AR 42      1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26
K 42      9.092E-18 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26
CA 45      7.844E-12 1.659E-12 2.515E-25 2.515E-25 2.515E-25 2.515E-25 2.515E-25 2.515E-25 2.515E-25
SC 46      8.136E-16 3.962E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
V 50      8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18
CR 51      1.218E+00 1.311E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
MN 54      1.676E-08 7.454E-09 1.539E-15 6.847E-16 3.046E-16 1.355E-16 6.027E-17 2.679E-17 1.191E-17
FE 59      3.739E-02 1.348E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CO 58      6.545E-08 1.830E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CO 60      9.389E-06 8.232E-06 6.763E-07 5.929E-07 5.199E-07 4.558E-07 3.996E-07 3.504E-07 3.072E-07
NI 63      2.195E-19 2.178E-19 1.889E-19 1.874E-19 1.860E-19 1.846E-19 1.832E-19 1.818E-19 1.805E-19
SR 89      1.353E-07 8.993E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90      4.666E-10 4.556E-10 2.899E-10 2.831E-10 2.764E-10 2.695E-10 2.635E-10 2.573E-10 2.513E-10
Y 90      8.286E-03 4.557E-10 2.899E-10 2.831E-10 2.765E-10 2.700E-10 2.636E-10 2.574E-10 2.514E-10
Y 91      6.329E-07 8.357E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93      2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08
ZR 95      1.152E-07 2.203E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92      2.084E-01 3.140E-12 0.000E+00 3.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 93M     6.607E-10 2.039E-09 1.839E-08 1.889E-08 1.936E-08 1.981E-08 2.024E-08 2.064E-08 2.103E-08
NB 94      3.969E-03 3.969E-03 3.966E-03 3.966E-03 3.966E-03 3.966E-03 3.966E-03 3.966E-03 3.966E-03
NB 95      1.317E+00 9.805E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M     8.271E-10 1.634E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98      5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25
TC 99      3.511E-18 3.774E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18

TL206    1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25
TL207    1.515E-11 7.794E-11 7.466E-09 8.136E-09 8.811E-09 9.508E-09 1.022E-08 1.096E-08 1.171E-08
TL208    9.691E-09 6.599E-08 7.944E-07 7.936E-07 7.890E-07 7.839E-07 7.783E-07 7.723E-07 7.661E-07
TL209    4.068E-14 1.106E-13 1.350E-12 1.417E-12 1.483E-12 1.555E-12 1.617E-12 1.684E-12 1.752E-12
PB209    1.883E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
PB210    1.195E-13 1.585E-13 1.234E-11 1.409E-11 1.599E-11 1.804E-11 2.025E-11 2.263E-11 2.517E-11
PB211    1.519E-11 7.816E-11 7.487E-09 8.159E-09 8.836E-09 9.534E-09 1.025E-08 1.099E-08 1.175E-08
PB212    2.697E-08 1.837E-07 2.211E-06 2.209E-06 2.196E-06 2.182E-06 2.166E-06 2.149E-06 2.132E-06
PB214    1.197E-13 5.343E-13 6.626E-11 7.276E-11 7.957E-11 8.668E-11 9.409E-11 1.018E-10 1.098E-10
B1208    5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24
B1210M   1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25
B1210    1.116E-13 1.586E-13 1.234E-11 1.410E-11 1.600E-11 1.805E-11 2.026E-11 2.264E-11 2.518E-11
B1211    1.519E-11 7.816E-11 7.487E-09 8.159E-09 8.836E-09 9.534E-09 1.025E-08 1.099E-08 1.175E-08
B1212    2.697E-08 1.837E-07 2.211E-06 2.209E-06 2.196E-06 2.182E-06 2.166E-06 2.149E-06 2.132E-06
B1213    1.883E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
B1214    1.197E-13 5.343E-13 6.626E-11 7.276E-11 7.957E-11 8.668E-11 9.409E-11 1.018E-10 1.098E-10
PO210    3.495E-14 1.346E-13 1.234E-11 1.314E-11 1.480E-11 1.672E-11 1.882E-11 2.107E-11 2.350E-11
PO211    4.253E-14 2.189E-13 2.096E-11 2.284E-11 2.474E-11 2.670E-11 2.871E-11 3.077E-11 3.289E-11
PO212    1.728E-08 1.177E-07 1.417E-06 1.415E-06 1.407E-06 1.398E-06 1.388E-06 1.377E-06 1.366E-06
PO213    1.843E-12 5.009E-12 6.116E-11 6.417E-11 6.719E-11 7.022E-11 7.326E-11 7.630E-11 7.935E-11
PO214    1.361E-11 5.343E-13 6.624E-11 7.275E-11 7.955E-11 8.666E-11 9.407E-11 1.018E-10 1.098E-10
PO215    1.519E-11 7.816E-11 7.487E-09 8.159E-09 8.836E-09 9.534E-09 1.025E-08 1.099E-08 1.175E-08
PO216    2.697E-08 1.837E-07 2.211E-06 2.209E-06 2.196E-06 2.182E-06 2.166E-06 2.149E-06 2.132E-06
PO218    1.197E-13 5.344E-13 6.627E-11 7.278E-11 7.958E-11 8.670E-11 9.411E-11 1.018E-10 1.099E-10
AT217    1.883E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
RN218    1.349E-11 6.989E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RN219    1.519E-11 7.816E-11 7.487E-09 8.159E-09 8.836E-09 9.534E-09 1.025E-08 1.099E-08 1.175E-08
RN220    2.697E-08 1.837E-07 2.211E-06 2.209E-06 2.196E-06 2.182E-06 2.166E-06 2.149E-06 2.132E-06
RN222    1.197E-13 5.344E-13 6.627E-11 7.278E-11 7.958E-11 8.670E-11 9.411E-11 1.018E-10 1.099E-10
FR221    1.883E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
FR223    2.650E-13 1.078E-12 1.033E-10 1.124E-10 1.217E-10 1.313E-10 1.412E-10 1.513E-10 1.617E-10
RA222    1.349E-11 6.989E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RA223    1.519E-11 7.816E-11 7.487E-09 8.159E-09 8.836E-09 9.534E-09 1.025E-08 1.099E-08 1.175E-08
RA224    2.697E-08 1.837E-07 2.211E-06 2.209E-06 2.196E-06 2.182E-06 2.166E-06 2.149E-06 2.132E-06
RA225    2.062E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
RA226    1.196E-13 5.344E-13 6.627E-11 7.278E-11 7.958E-11 8.670E-11 9.411E-11 1.018E-10 1.099E-10
RA228    5.344E-17 3.650E-16 3.840E-14 4.123E-14 4.411E-14 4.701E-14 4.995E-14 5.291E-14 5.589E-14

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwss3
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97      at 08:31:08
      345.0D    1.0YR   20.0YR   21.0YR   22.0YR   23.0YR   24.0YR   25.0YR   26.0YR

AC225    1.883E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
AC227    1.920E-11 7.812E-11 7.487E-09 8.142E-09 8.818E-09 9.514E-09 1.023E-08 1.097E-08 1.172E-08
AC228    1.396E-11 3.650E-16 3.840E-14 4.124E-14 4.411E-14 4.702E-14 4.995E-14 5.291E-14 5.590E-14
TH226    1.349E-11 6.989E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TH227    1.648E-11 7.708E-11 7.384E-09 8.046E-09 8.714E-09 9.403E-09 1.011E-08 1.084E-08 1.158E-08
TH228    2.685E-08 1.836E-07 2.211E-06 2.201E-06 2.188E-06 2.174E-06 2.158E-06 2.142E-06 2.124E-06
TH229    2.161E-12 5.120E-12 6.251E-11 6.559E-11 6.868E-11 7.177E-11 7.487E-11 7.798E-11 8.110E-11
TH230    6.060E-10 1.309E-09 1.473E-08 1.544E-08 1.614E-08 1.685E-08 1.756E-08 1.827E-08 1.898E-08
TH231    6.341E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05
TH232    1.595E-15 4.796E-15 6.563E-14 6.883E-14 7.204E-14 7.524E-14 7.844E-14 8.164E-14 8.484E-14
TH234    9.982E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06
PA231    1.228E-09 2.558E-09 2.772E-08 2.905E-08 3.038E-08 3.171E-08 3.303E-08 3.436E-08 3.569E-08
PA233    1.268E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05
PA234M   1.002E-05 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06
PA234    5.524E-08 1.294E-08 1.294E-08 1.294E-08 1.294E-08 1.294E-08 1.294E-08 1.294E-08 1.294E-08
U230     1.349E-11 6.982E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
U232     2.703E-07 7.635E-07 2.185E-06 2.168E-06 2.151E-06 2.132E-06 2.114E-06 2.095E-06 2.076E-06
U233     3.129E-08 3.137E-08 3.265E-08 3.273E-08 3.280E-08 3.288E-08 3.295E-08 3.303E-08 3.310E-08
U234     7.814E-05 7.817E-05 7.873E-05 7.876E-05 7.879E-05 7.881E-05 7.884E-05 7.886E-05 7.889E-05
U235     6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05 6.260E-05
U236     6.490E-05 6.490E-05 6.490E-05 6.490E-05 6.490E-05 6.490E-05 6.490E-05 6.490E-05 6.490E-05
U237     8.873E+01 1.865E-07 7.474E-08 7.123E-08 6.788E-08 6.469E-08 6.165E-08 5.875E-08 5.599E-08
U238     9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06 9.957E-06
U240     9.265E-06 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18
NP235    2.065E-06 1.090E-06 5.790E-12 3.056E-12 1.612E-12 8.509E-13 4.490E-13 2.369E-13 1.250E-13
NP236    1.106E-09 1.106E-09 1.106E-09 1.106E-09 1.106E-09 1.106E-09 1.106E-09 1.106E-09 1.106E-09
NP237    1.475E-05 1.551E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05 1.552E-05
NP238    4.160E+00 1.618E-10 1.483E-10 1.477E-10 1.470E-10 1.463E-10 1.456E-10 1.450E-10 1.443E-10
NP239    1.451E+03 5.403E-10 5.393E-10 5.393E-10 5.392E-10 5.392E-10 5.391E-10 5.391E-10 5.390E-10
NP240M   1.889E-02 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18 1.058E-18
PU236    5.756E-05 4.567E-05 4.503E-07 3.531E-07 2.770E-07 2.172E-07 1.703E-07 1.336E-07 1.048E-07
PU237    1.448E-04 5.617E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PU238    1.109E-02 1.128E-02 9.707E-03 9.631E-03 9.555E-03 9.480E-03 9.405E-03 9.331E-03 9.258E-03
PU239    3.485E-02 3.524E-02 3.522E-02 3.522E-02 3.522E-02 3.522E-02 3.522E-02 3.522E-02 3.521E-02
PU240    1.767E-03 1.767E-03 1.763E-03 1.763E-03 1.763E-03 1.762E-03 1.762E-03 1.762E-03 1.762E-03
PU241    7.979E-03 7.604E-03 3.047E-03 2.904E-03 2.767E-03 2.637E-03 2.513E-03 2.395E-03 2.282E-03
PU242    1.964E-09 1.964E-09 1.964E-09 1.964E-09 1.964E-09 1.964E-09 1.964E-09 1.964E-09 1.964E-09
PU243    3.152E-05 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23
PU244    1.059E-18 1.059E-18 1.059E-18 1.059E-18 1.059E-18 1.059E-18 1.059E-18 1.059E-18 1.059E-18
PU246    4.621E-17 3.396E-27 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
AM241    2.935E-06 1.541E-05 1.641E-04 1.686E-04 1.729E-04 1.770E-04 1.808E-04 1.845E-04 1.879E-04
AM242M   3.250E-08 3.235E-08 2.966E-08 2.953E-08 2.940E-08 2.926E-08 2.913E-08 2.900E-08 2.886E-08
AM242    1.593E-04 3.219E-08 2.952E-08 2.938E-08 2.925E-08 2.912E-08 2.898E-08 2.885E-08 2.872E-08
AM243    5.379E-10 5.403E-10 5.393E-10 5.393E-10 5.392E-10 5.392E-10 5.391E-10 5.390E-10 5.390E-10
AM245    1.547E-12 7.037E-29 2.122E-35 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
AM246    4.621E-17 3.402E-27 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM241    2.783E-11 2.457E-14 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CM242    3.026E-05 6.550E-06 2.441E-08 2.433E-08 2.422E-08 2.411E-08 2.400E-08 2.389E-08 2.379E-08
CM243    1.347E-09 1.314E-09 8.281E-10 8.082E-10 7.887E-10 7.698E-10 7.513E-10 7.332E-10 7.156E-10
CM244    2.070E-09 1.995E-09 9.640E-10 9.278E-10 8.929E-10 8.594E-10 8.271E-10 7.961E-10 7.662E-10
CM245    2.964E-14 2.964E-14 2.960E-14 2.959E-14 2.959E-14 2.959E-14 2.959E-14 2.958E-14 2.958E-14
CM246    1.190E-16 1.190E-16 1.187E-16 1.187E-16 1.187E-16 1.186E-16 1.186E-16 1.186E-16 1.186E-16
CM247    5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23 5.148E-23
CM248    3.916E-24 3.916E-24 3.916E-24 3.916E-24 3.916E-24 3.916E-24 3.916E-24 3.916E-24 3.916E-24
CM250    4.907E-37 4.907E-37 4.907E-37 4.907E-37 4.907E-37 4.907E-37 4.907E-37 4.907E-37 4.907E-37
BK249    7.706E-25 4.853E-24 1.439E-30 1.439E-30 1.439E-30 1.439E-30 1.439E-30 1.439E-30 1.439E-30
CF250    0.000E+00 1.407E-30 1.407E-30 1.407E-30 1.407E-30 1.407E-30 1.407E-30 1.407E-30 1.407E-30
CF251    0.000E+00 1.377E-37 1.377E-37 1.377E-37 1.377E-37 1.377E-37 1.377E-37 1.377E-37 1.377E-37

H 3      9.254E-02 8.749E-02 3.011E-02 2.847E-02 2.692E-02 2.545E-02 2.406E-02 2.275E-02 2.150E-02
BE 10    3.288E-10 3.288E-10 3.288E-10 3.288E-10 3.288E-10 3.288E-10 3.288E-10 3.288E-10 3.288E-10
C 14     1.326E-08 1.326E-08 1.323E-08 1.323E-08 1.323E-08 1.322E-08 1.322E-08 1.322E-08 1.322E-08
SE 79     6.066E-05 6.067E-05 6.065E-05 6.065E-05 6.065E-05 6.065E-05 6.065E-05 6.065E-05 6.065E-05
KR 81     2.477E-12 2.477E-12 2.476E-12 2.476E-12 2.476E-12 2.476E-12 2.476E-12 2.476E-12 2.476E-12
KR 85     1.426E+00 1.338E+00 3.917E-01 3.672E-01 3.442E-01 3.226E-01 3.024E-01 2.835E-01 2.657E-01
RB 86     1.004E+00 1.284E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RB 87     3.035E-09 3.036E-09 3.036E-09 3.036E-09 3.036E-09 3.036E-09 3.036E-09 3.036E-09 3.036E-09
SR 89     3.908E+02 2.598E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SR 90     1.053E+01 1.029E+01 6.544E+00 6.391E+00 6.240E+00 6.093E+00 5.950E+00 5.810E+00 5.674E+00
Y 90      1.101E+01 1.029E+01 6.546E+00 6.392E+00 6.242E+00 6.095E+00 5.952E+00 5.812E+00 5.675E+00
Y 91      4.788E+02 6.367E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 92     1.462E-10 2.203E-21 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
ZR 93     2.359E-04 2.363E-04 2.363E-04 2.363E-04 2.363E-04 2.363E-04 2.363E-04 2.363E-04 2.363E-04
NB 93M   5.360E-06 1.625E-05 1.454E-04 1.493E-04 1.531E-04 1.566E-04 1.600E-04 1.632E-04 1.662E-04

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**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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sbwss3
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:08
    345.0D   1.0YR   20.0YR   21.0YR   22.0YR   23.0YR   24.0YR   25.0YR   26.0YR

NB 94     2.350E-09  2.350E-09  2.348E-09  2.348E-09  2.348E-09  2.348E-09  2.348E-09  2.348E-09  2.348E-09
ZR 95     5.416E+02  1.036E+01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
NB 95      5.255E+02  2.329E+01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
NB 95M     3.932E+00  7.683E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TC 98     9.251E-10  9.251E-10  9.251E-10  9.251E-10  9.251E-10  9.251E-10  9.251E-10  9.251E-10  9.251E-10
TC 99     1.517E-03  1.536E-03  1.536E-03  1.536E-03  1.536E-03  1.536E-03  1.536E-03  1.536E-03  1.536E-03
RH102     2.066E-04  1.627E-04  1.734E-06  1.366E-06  1.075E-06  8.466E-07  6.666E-07  5.249E-07  4.133E-07
RU103     3.036E+02  4.839E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
RH103M    2.736E+02  4.362E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
RU106     3.029E+01  1.523E+01  3.224E-05  1.621E-05  8.149E-06  4.097E-06  2.060E-06  1.036E-06  5.207E-07
RH106     3.031E+01  1.523E+01  3.224E-05  1.621E-05  8.149E-06  4.097E-06  2.060E-06  1.036E-06  5.207E-07
AG106     3.703E-11  4.297E-24  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PD107     4.168E-06  4.168E-06  4.168E-06  4.168E-06  4.168E-06  4.168E-06  4.168E-06  4.168E-06  4.168E-06
AG108     3.729E-04  1.214E-11  1.094E-11  1.089E-11  1.083E-11  1.077E-11  1.071E-11  1.065E-11  1.059E-11
AG108M    1.372E-10  1.364E-10  1.230E-10  1.223E-10  1.216E-10  1.210E-10  1.203E-10  1.197E-10  1.190E-10
AG109M    1.975E+01  1.747E-07  5.496E-12  3.185E-12  1.846E-12  1.069E-12  6.197E-13  3.591E-13  2.081E-13
CD109     3.015E-07  1.747E-07  5.496E-12  3.185E-12  1.846E-12  1.069E-12  6.197E-13  3.591E-13  2.081E-13
AG110     5.202E-01  1.959E-04  8.549E-13  3.104E-13  1.127E-13  4.092E-14  1.486E-14  5.394E-15  1.958E-15
AG110M    4.057E-02  1.473E-02  6.428E-11  2.334E-11  8.473E-12  3.076E-12  1.117E-12  4.055E-13  1.472E-13
AG111     1.117E+01  1.955E-14  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CD113M    6.960E-03  6.641E-03  2.693E-03  2.568E-03  2.449E-03  2.335E-03  2.227E-03  2.123E-03  2.025E-03
IN114     1.634E-04  2.272E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
IN114M    3.945E-05  2.374E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CD115M    7.893E-01  2.703E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
IN115     9.704E-15  1.000E-14  1.000E-14  1.000E-14  1.000E-14  1.000E-14  1.000E-14  1.000E-14  1.000E-14
IN115M    8.176E+00  1.900E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN117M    9.140E-04  2.288E-11  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN119M    8.028E-02  2.857E-02  8.508E-11  3.028E-11  1.077E-11  3.834E-12  1.364E-12  4.855E-13  1.728E-13
SN121M    5.181E-05  5.110E-05  3.926E-05  3.872E-05  3.818E-05  3.766E-05  3.714E-05  3.663E-05  3.612E-05
SN123     1.745E+00  2.457E-01  1.648E-17  2.249E-18  3.564E-19  1.436E-19  0.000E+00  0.000E+00  0.000E+00
TE123     4.896E-17  5.302E-17  5.357E-17  5.357E-17  5.357E-17  5.357E-17  5.357E-17  5.357E-17  5.357E-17
TE123M    1.408E-04  1.697E-05  5.939E-23  5.939E-23  5.939E-23  5.939E-23  5.939E-23  5.939E-23  5.939E-23
SB124     1.122E-01  1.673E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SN125     4.297E+00  1.689E-11  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SB125     2.932E+00  2.315E+00  1.994E-02  1.553E-02  1.209E-02  9.412E-03  7.328E-03  5.706E-03  4.443E-03
TE125M    5.227E-01  5.624E-01  4.865E-03  3.788E-03  2.949E-03  2.296E-03  1.788E-03  1.392E-03  1.084E-03
SN126     1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04
SB126     5.216E-01  1.872E-05  1.871E-05  1.871E-05  1.871E-05  1.871E-05  1.871E-05  1.871E-05  1.871E-05
SB126M    2.608E-01  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04  1.337E-04
TE127     3.623E+01  4.512E-01  3.086E-20  3.076E-20  3.076E-20  3.076E-20  3.076E-20  3.076E-20  3.076E-20
TE127M    4.509E+00  4.606E-01  3.150E-20  3.150E-20  3.150E-20  3.150E-20  3.150E-20  3.150E-20  3.150E-20
XE127     6.714E-06  6.417E-09  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129     9.539E+00  4.958E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TE129M    1.420E+01  7.617E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I129      4.078E-06  4.164E-06  4.164E-06  4.164E-06  4.164E-06  4.164E-06  4.164E-06  4.164E-06  4.164E-06
XE129M    3.352E-05  6.046E-19  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
I131      2.883E+02  6.260E-12  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE131M    3.219E+00  5.774E-09  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS132     1.705E-02  1.777E-19  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
XE133     5.565E+02  7.500E-19  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS134     2.331E+00  1.665E+00  2.809E-03  2.070E-03  1.434E-03  1.025E-03  7.322E-04  5.232E-04  3.738E-04
CS135     1.586E-04  1.590E-04  1.590E-04  1.590E-04  1.590E-04  1.590E-04  1.590E-04  1.590E-04  1.590E-04
CS136     4.460E+00  1.808E-08  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
BA136M    7.350E-01  2.980E-09  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CS137     1.147E+01  1.121E+01  7.227E+00  7.062E+00  6.901E+00  6.743E+00  6.589E+00  6.439E+00  6.292E+00
BA137M    1.089E+01  1.061E+01  6.837E+00  6.691E+00  6.528E+00  6.379E+00  6.234E+00  6.091E+00  5.952E+00
LA138     1.146E-14  1.146E-14  1.146E-14  1.146E-14  1.146E-14  1.146E-14  1.146E-14  1.146E-14  1.146E-14
BA140     5.218E+02  1.320E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
LA140     5.305E+02  1.519E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE141     5.204E+02  2.172E-01  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE142     3.041E-09  3.042E-09  3.042E-09  3.042E-09  3.042E-09  3.042E-09  3.042E-09  3.042E-09  3.042E-09
PR143     4.784E+02  4.189E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CE144     2.597E+02  1.066E+02  4.769E-06  1.957E-06  8.032E-07  3.296E-07  1.353E-07  5.552E-08  2.278E-08
PR144     2.602E+02  1.066E+02  4.769E-06  1.957E-06  8.032E-07  3.296E-07  1.353E-07  5.552E-08  2.278E-08
PR144M    3.119E+00  1.279E+00  5.723E-08  2.349E-08  9.638E-09  3.956E-09  1.623E-09  6.662E-10  2.734E-10
ND144     4.745E-14  1.042E-13  1.437E-13  1.437E-13  1.437E-13  1.437E-13  1.437E-13  1.437E-13  1.437E-13
PM146     1.057E-03  9.322E-04  8.503E-05  7.496E-05  6.609E-05  5.826E-05  5.136E-05  4.528E-05  3.992E-05
SM146     1.627E-11  1.991E-11  4.454E-11  4.483E-11  4.509E-11  4.532E-11  4.552E-11  4.570E-11  4.585E-11
ND147     2.076E+02  2.379E-08  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM147     4.088E+01  3.325E+01  2.196E-01  1.686E-01  1.295E-01  9.941E-02  7.633E-02  5.860E-02  4.500E-02
SM147     1.256E-10  3.721E-10  1.182E-09  1.183E-09  1.184E-09  1.185E-09  1.186E-09  1.187E-09  1.188E-09
PM148     1.183E+01  1.574E-03  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PM148M    1.285E+01  2.792E-02  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SM148     9.057E-16  1.109E-15  1.109E-15  1.109E-15  1.109E-15  1.109E-15  1.109E-15  1.109E-15  1.109E-15

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

**sbwss3**  
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:08  
345.0D 1.0YR 20.0YR 21.0YR 22.0YR 23.0YR 24.0YR 25.0YR 26.0YR

SM149	6.135E-15	6.196E-15						
EU150	3.583E-08	3.515E-08	2.438E-08	2.391E-08	2.346E-08	2.301E-08	2.257E-08	2.214E-08
SM151	2.733E-01	2.726E-01	2.355E-01	2.337E-01	2.319E-01	2.301E-01	2.284E-01	2.266E-01
EU152	4.023E-04	3.823E-04	1.452E-04	1.379E-04	1.311E-04	1.246E-04	1.184E-04	1.125E-04
GD152	1.946E-17	2.026E-17	2.858E-17	2.883E-17	2.907E-17	2.930E-17	2.952E-17	2.972E-17
GD153	1.863E-04	6.544E-05	1.527E-13	5.364E-14	1.884E-14	6.620E-15	2.326E-15	8.170E-16
EU154	7.611E-02	7.021E-02	1.518E-02	1.401E-02	1.292E-02	1.192E-02	1.100E-02	1.015E-02
EU155	6.283E-01	5.464E-01	3.839E-02	3.338E-02	2.903E-02	2.524E-02	2.195E-02	1.908E-02
EU156	3.188E+00	1.871E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB160	1.835E-02	5.534E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TB161	8.877E-02	1.148E-17	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HO166M	7.785E-09	7.781E-09	7.696E-09	7.691E-09	7.687E-09	7.682E-09	7.678E-09	7.674E-09
ER169	2.099E-07	4.218E-19	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
TM170	3.205E-09	4.475E-10	2.538E-26	2.538E-26	2.538E-26	2.538E-26	2.538E-26	2.538E-26
TM171	4.776E-12	3.328E-12	3.493E-15	2.434E-15	1.697E-15	1.183E-15	8.242E-16	5.744E-16

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

-1
-1
-1
RDA      ORIGEN2, VERSION 2.1 (8-1-91) EBR-II
BAS      ONE ELEMENT
CUT      -1
LIP      0 0 0
LIB      0 1 2 3 381 382 383 9 50 0 4 0
TIT      ONE CYCLE FOR ONE EBR-II ELEMENT
INP      -1 1 -1 -1 1 1
MOV      -1 1 0 1.0
HED      1
BUP
IRP      50.0 .01068 1 2 4 2
IRP      100.0 .01068 2 3 4 0
IRP      200.0 .01068 3 4 4 0
IRP      250.0 .01068 4 5 4 0
IRP      300.0 .01068 5 6 4 0
IRP      345.0 .01068 6 7 4 0
BUP
OPTL     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
OPTA     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
OPTF     8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8
MOV      7 1 0 1.0
DEC      1. 1 2 5 4
DEC      34. 2 3 5 0
DEC      35. 3 4 5 0
DEC      36. 4 5 5 0
DEC      37. 5 6 5 0
DEC      38. 6 7 5 0
DEC      39. 7 8 5 0
DEC      40. 8 9 5 0
OUT      -9 1 -1 0
OUT      9 1 -1 0
END
2 922340 1.04E-2 922350 33.6 922360 5.10E-2 922380 30.34 FUEL 52.5%
1 60120 5.64E-3 60130 6.27E-5 140280 1.75E-1 140290 8.87E-3
1 140300 5.89E-3 150310 8.55E-3 160320 5.42E-3 160330 4.28E-5
1 160340 2.40E-4 160350 1.14E-6 160540 7.61E-1 240500 1.57E-1
1 240520 3.02E+0 240530 3.43E-1 240540 8.54E-2 250240 3.00E-1
1 250250 3.80E-2 250260 4.18E-2 260560 1.183E+1 260570 2.71E-1
1 260580 3.61E-2 410930 1.90E+00 0 0. 0 0.
0

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2      **
echo **
copy sbwss2.INP tape5.inp >nul
REM   (NOT USED IN THIS CASE) copy sbwss2.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\fftfc.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
echo finished with origen2 calculation
rem   combine and save files from run
copy tape12.out+tape6.out sbwss2.u6 >nul
copy tape13.out+tapel1.out sbwss2.u11 >nul
ren tape7.out sbwss2.pch
ren tape15.out sbwss2.dbg
ren tape16.out sbwss2.vxs
ren tape50.out sbwss2.ech
rem   cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

```
sbwss5  
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:40  
          345.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR  
  
H 3     1.532E-09 1.449E-09 2.272E-10 2.148E-10 2.031E-10 1.920E-10 1.815E-10 1.716E-10 1.623E-10  
BE 10   3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11 3.349E-11  
C 14     3.500E-11 3.499E-11 3.498E-11 3.498E-11 3.498E-11 3.498E-11 3.498E-11 3.498E-11 3.498E-11  
NA 22   3.050E-16 2.337E-16 3.554E-20 3.554E-20 3.554E-20 3.554E-20 3.554E-20 3.554E-20 3.554E-20  
SI 32     5.062E-13 5.056E-13 4.881E-13 4.876E-13 4.871E-13 4.866E-13 4.861E-13 4.855E-13 4.850E-13  
P 32     7.091E-02 1.452E-09 4.882E-13 4.876E-13 4.871E-13 4.866E-13 4.861E-13 4.856E-13 4.850E-13  
P 33     5.987E-08 2.394E-12 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
S 35     3.232E-03 1.820E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
CL 36     3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11 3.908E-11  
AR 37     2.425E-15 1.759E-18 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
AR 39     1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22 1.553E-22  
AR 42     1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26  
K 42     9.092E-18 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26 1.301E-26  
CA 45     7.844E-12 1.659E-12 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
SC 46     8.136E-16 3.962E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
V 50     8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18 8.473E-18  
CR 51     1.218E+00 1.311E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
MN 54     1.676E-08 7.454E-09 1.826E-20 1.826E-20 1.826E-20 1.826E-20 1.826E-20 1.826E-20 1.826E-20  
FE 59     3.739E-02 1.348E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
CO 58     6.545E-08 1.830E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
CO 60     9.389E-06 8.232E-06 1.072E-07 9.403E-08 8.244E-08 7.228E-08 6.337E-08 5.556E-08 4.871E-08  
NI 63     2.195E-19 2.178E-19 1.698E-19 1.685E-19 1.673E-19 1.660E-19 1.648E-19 1.635E-19 1.623E-19  
SR 89     1.353E-07 8.993E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
SR 90     4.666E-10 4.556E-10 2.077E-10 2.028E-10 1.981E-10 1.934E-10 1.889E-10 1.844E-10 1.801E-10  
Y 90     8.286E-03 4.557E-10 2.078E-10 2.029E-10 1.981E-10 1.935E-10 1.889E-10 1.845E-10 1.801E-10  
Y 91     6.329E-07 8.357E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
Zr 93     2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08 2.989E-08  
Zr 95     1.152E-07 2.203E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
Nb 92     2.084E-01 3.140E-12 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
Nb 93M    6.607E-10 2.039E-12 3.350E-08 2.374E-08 2.397E-08 2.419E-08 2.440E-08 2.460E-08 2.479E-08  
Nb 94     3.969E-03 3.969E-03 3.964E-03 3.964E-03 3.964E-03 3.964E-03 3.964E-03 3.964E-03 3.964E-03  
Nb 95     1.317E+00 9.805E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
Nb 95M    8.271E-10 1.634E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
TC 98     5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25 5.897E-25  
TC 99     3.511E-18 3.774E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18 3.773E-18TL206    1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25 1.879E-25  
TL207    1.515E-11 7.794E-11 1.829E-08 1.922E-08 2.013E-08 2.105E-08 2.199E-08 2.293E-08 2.389E-08  
TL208    9.691E-09 6.599E-08 7.107E-07 7.056E-07 6.998E-07 6.931E-07 6.865E-07 6.799E-07 6.734E-07  
TL209    4.068E-14 1.106E-13 2.294E-12 2.362E-12 2.431E-12 2.500E-12 2.568E-12 2.637E-12 2.707E-12  
PB209    1.883E-12 5.120E-12 1.062E-10 1.094E-10 1.125E-10 1.157E-10 1.189E-10 1.221E-10 1.253E-10  
PB210    1.195E-13 1.585E-13 5.205E-11 5.628E-11 6.071E-11 6.535E-11 7.020E-11 7.526E-11 8.054E-11  
PB211    1.519E-11 7.816E-11 1.834E-08 1.928E-08 2.019E-08 2.111E-08 2.205E-08 2.300E-08 2.396E-08  
PB212    2.697E-08 1.837E-07 1.978E-06 1.966E-06 1.948E-06 1.929E-06 1.911E-06 1.892E-06 1.874E-06  
PB214    1.197E-13 5.343E-13 1.850E-10 1.957E-10 2.068E-10 2.181E-10 2.298E-10 2.418E-10 2.541E-10  
BI208    5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24 5.568E-24  
BI210M   1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25 1.887E-25  
BI210    1.116E-13 1.586E-13 5.205E-11 5.631E-11 6.074E-11 6.539E-11 7.024E-11 7.530E-11 8.058E-11  
BI211    1.519E-11 7.816E-11 1.834E-C8 1.928E-08 2.019E-08 2.111E-08 2.205E-08 2.300E-08 2.396E-08  
BI212    2.697E-08 1.837E-07 1.978E-C6 1.966E-06 1.948E-06 1.929E-06 1.911E-06 1.892E-06 1.874E-06  
BI213    1.883E-12 5.120E-12 1.062E-10 1.094E-10 1.125E-10 1.157E-10 1.189E-10 1.221E-10 1.253E-10  
BI214    1.197E-13 5.343E-13 1.850E-10 1.957E-10 2.068E-10 2.181E-10 2.298E-10 2.418E-10 2.541E-10  
PO210    3.495E-14 1.346E-13 5.205E-11 5.377E-11 5.766E-11 6.207E-11 6.674E-11 7.162E-11 7.672E-11  
PO211    4.253E-14 1.189E-13 5.135E-11 5.398E-11 5.653E-11 5.912E-11 6.174E-11 6.440E-11 6.709E-11  
PO212    1.728E-08 1.177E-07 1.267E-C6 1.260E-06 1.248E-06 1.235E-06 1.224E-06 1.212E-06 1.201E-06  
PO213    1.843E-12 5.009E-12 1.039E-10 1.070E-10 1.101E-10 1.132E-10 1.163E-10 1.195E-10 1.226E-10  
PO214    1.361E-11 5.343E-13 1.849E-08 1.957E-10 2.067E-10 2.181E-10 2.298E-10 2.417E-10 2.540E-10  
PO215    1.519E-11 7.816E-11 1.834E-C8 1.928E-08 2.019E-08 2.111E-08 2.205E-08 2.300E-08 2.396E-08  
PO216    2.697E-08 1.837E-07 1.978E-C6 1.966E-06 1.948E-06 1.929E-06 1.911E-06 1.892E-06 1.874E-06  
PO218    1.197E-13 5.344E-13 1.850E-10 1.958E-10 2.068E-10 2.182E-10 2.299E-10 2.418E-10 2.541E-10  
AT217    1.883E-12 5.120E-12 1.062E-10 1.094E-10 1.125E-10 1.157E-10 1.189E-10 1.221E-10 1.253E-10  
RN218    1.349E-11 6.989E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
RN219    1.519E-11 7.816E-11 1.834E-C6 1.928E-08 2.019E-08 2.111E-08 2.205E-08 2.300E-08 2.396E-08  
RN220    2.697E-08 1.837E-07 1.978E-C6 1.966E-06 1.948E-06 1.929E-06 1.911E-06 1.892E-06 1.874E-06  
RN222    1.197E-13 5.344E-13 1.850E-10 1.958E-10 2.068E-10 2.182E-10 2.299E-10 2.418E-10 2.541E-10  
FR221    1.883E-12 5.120E-12 1.062E-10 1.094E-10 1.125E-10 1.157E-10 1.189E-10 1.221E-10 1.253E-10  
FR223    2.650E-13 1.078E-12 2.531E-10 2.655E-10 2.780E-10 2.907E-10 3.036E-10 3.167E-10 3.299E-10  
RA222    1.349E-11 6.989E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00  
RA223    1.519E-11 7.816E-11 1.834E-08 1.928E-08 2.019E-08 2.111E-08 2.205E-08 2.300E-08 2.396E-08  
RA224    2.697E-08 1.837E-07 1.978E-C6 1.966E-06 1.948E-06 1.929E-06 1.911E-06 1.892E-06 1.874E-06  
RA225    2.062E-12 5.120E-12 1.062E-10 1.094E-10 1.125E-10 1.157E-10 1.189E-10 1.221E-10 1.253E-10  
RA226    1.196E-13 5.344E-13 1.850E-10 1.958E-10 2.068E-10 2.182E-10 2.299E-10 2.418E-10 2.541E-10  
RA228    5.344E-17 3.650E-16 8.038E-14 8.350E-14 8.662E-14 8.975E-14 9.604E-14 9.919E-14
```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwss5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:40
      345.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

AC225    1.883E-12  5.120E-12  1.062E-10  1.094E-10  1.125E-10  1.157E-10  1.189E-10  1.221E-10  1.253E-10
AC227    1.920E-11  7.812E-11  1.834E-08  1.924E-08  2.015E-08  2.107E-08  2.200E-08  2.295E-08  2.391E-08
AC228    1.396E-11  3.650E-16  8.038E-14  8.350E-14  8.663E-14  8.976E-14  9.290E-14  9.605E-14  9.920E-14
TH226    1.349E-11  6.989E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
TH227    1.648E-11  7.708E-11  1.809E-08  1.901E-08  1.991E-08  2.082E-08  2.175E-08  2.268E-08  2.363E-08
TH228    2.685E-08  1.836E-07  1.978E-06  1.959E-06  1.940E-06  1.922E-06  1.904E-06  1.885E-06  1.867E-06
TH229    2.161E-12  5.120E-12  1.062E-10  1.094E-10  1.125E-10  1.157E-10  1.189E-10  1.221E-10  1.253E-10
TH230    6.060E-10  1.309E-09  2.467E-08  2.538E-08  2.609E-08  2.681E-08  2.752E-08  2.823E-08  2.894E-08
TH231    6.341E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05
TH232    1.595E-15  4.796E-15  1.105E-13  1.137E-13  1.169E-13  1.201E-13  1.233E-13  1.265E-13  1.297E-13
TH234    9.982E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06
PA231    1.228E-09  2.558E-09  4.625E-08  4.758E-08  4.890E-08  5.023E-08  5.156E-08  5.289E-08  5.422E-08
PA233    1.268E-05  1.552B-05  1.552B-05  1.552B-05  1.552B-05  1.552B-05  1.552B-05  1.552B-05  1.552B-05
PA234M   1.002E-05  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06
PA234    5.524E-08  1.294E-08  1.294E-08  1.294E-08  1.294E-08  1.294E-08  1.294E-08  1.294E-08  1.294E-08
U230    1.349E-11  6.982E-17  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
U232    2.703E-07  7.635E-07  1.925E-06  1.907E-06  1.889E-06  1.871E-06  1.853E-06  1.835E-06  1.818E-06
U233    3.129E-08  3.137E-08  3.360E-08  3.367E-08  3.375E-08  3.382E-08  3.390E-08  3.397E-08  3.405E-08
U234    7.814E-05  7.817E-05  7.909E-05  7.912E-05  7.914E-05  7.917E-05  7.919E-05  7.921E-05  7.924E-05
U235    6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05  6.260E-05
U236    6.490E-05  6.490E-05  6.490E-05  6.490E-05  6.490E-05  6.490E-05  6.490E-05  6.490E-05  6.491E-05
U237    8.873E+01  1.865E-07  3.810E-08  3.631E-08  3.460E-08  3.297E-08  3.142E-08  2.995E-08  2.854E-08
U238    9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06  9.957E-06
U240    9.265E-05  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18
NP235    2.065E-06  1.090E-06  7.519E-16  3.968E-16  2.094E-16  1.105E-16  5.829E-17  3.076E-17  1.625E-17
NP236    1.106E-09  1.106E-09  1.106E-09  1.106E-09  1.106E-09  1.106E-09  1.106E-09  1.106E-09  1.106E-09
NP237    1.475E-05  1.551E-05  1.552E-05  1.552E-05  1.552E-05  1.552E-05  1.552E-05  1.552E-05  1.552E-05
NP238    4.160E+00  1.618E-10  1.392E-10  1.385E-10  1.379E-10  1.373E-10  1.366E-10  1.360E-10  1.354E-10
NP239    1.451E+03  5.403E-10  5.386E-10  5.386E-10  5.386E-10  5.386E-10  5.384E-10  5.383E-10  5.383E-10
NP240M   1.889E-02  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18  1.058E-18
PU236    5.756B-05  4.567E-05  1.507E-08  1.184E-08  9.304E-09  7.317E-09  5.760E-09  4.538E-09  3.580E-09
PU237    1.448E-04  5.617E-07  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
PU238    1.109E-02  1.128E-02  8.691E-03  8.623E-03  8.555E-03  8.488E-03  8.421E-03  8.354E-03  8.289E-03
PU239    3.485E-02  3.524E-02  3.521E-02  3.520E-02  3.520E-02  3.520E-02  3.520E-02  3.520E-02  3.520E-02
PU240    1.767E-03  1.767E-03  1.760E-03  1.760E-03  1.760E-03  1.760E-03  1.760E-03  1.759E-03  1.759E-03
PU241    7.979E-03  7.604E-03  1.553E-03  1.480E-03  1.410E-03  1.344E-03  1.281E-03  1.221E-03  1.163E-03
PU242    1.964E-09  1.964E-09  1.964E-09  1.964E-09  1.964E-09  1.964E-09  1.964E-09  1.964E-09  1.964E-09
PU243    3.152E-05  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23
PU244    1.059E-18  1.059E-18  1.059E-18  1.059E-18  1.059E-18  1.059E-18  1.059E-18  1.059E-18  1.059E-18
PU246    4.621E-17  3.396E-27  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
AM241    2.935E-06  1.541E-05  2.096E-04  2.117E-04  2.137E-04  2.156E-04  2.173E-04  2.190E-04  2.206E-04
AM242M   3.250E-08  2.325E-08  2.783E-08  2.770E-08  2.758E-08  2.745E-08  2.733E-08  2.720E-08  2.708E-08
AM242    1.593E-04  3.219E-08  2.769E-08  2.757E-08  2.744E-08  2.732E-08  2.719E-08  2.707E-08  2.694E-08
AM243    5.379E-10  5.403E-10  5.386E-10  5.386E-10  5.385E-10  5.385E-10  5.384E-10  5.384E-10  5.383E-10
AM245    1.547E-12  7.037E-29  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
AM246    4.621E-17  3.402E-27  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CM241    2.783E-11  2.457E-14  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
CM242    3.026E-05  6.550E-06  2.290E-08  2.282E-08  2.272E-08  2.262E-08  2.252E-08  2.242E-08  2.231E-08
CM243    1.347E-09  1.314E-09  5.891E-10  5.749E-10  5.611E-10  5.476E-10  5.345E-10  5.216E-10  5.091E-10
CM244    2.070E-09  1.995E-09  5.641E-10  5.429E-10  5.225E-10  5.029E-10  4.840E-10  4.658E-10  4.483E-10
CM245    2.964E-14  2.964E-14  2.956E-14  2.956E-14  2.956E-14  2.955E-14  2.955E-14  2.955E-14  2.955E-14
CM246    1.190E-16  1.190E-16  1.184E-16  1.184E-16  1.184E-16  1.184E-16  1.184E-16  1.184E-16  1.183E-16
CM247    5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23  5.148E-23
CM248    3.916E-24  3.916E-24  3.916E-24  3.916E-24  3.916E-24  3.916E-24  3.916E-24  3.916E-24  3.916E-24
CM250    4.907E-37  4.907E-37  4.907E-37  4.907E-37  4.907E-37  4.907E-37  4.907E-37  4.907E-37  4.907E-37
BK249    7.706E-25  4.853E-24  2.229E-35  2.229E-35  2.229E-35  2.229E-35  2.229E-35  2.229E-35  2.229E-35
CP250    0.000E+00  1.407E-30  1.407E-30  1.407E-30  1.407E-30  1.407E-30  1.407E-30  1.407E-30  1.407E-30
CF251    0.000E+00  1.377E-37  1.377E-37  1.377E-37  1.377E-37  1.377E-37  1.377E-37  1.377E-37  1.377E-37

H 3      9.254E-02  8.749E-02  1.372E-02  1.298E-02  1.227E-02  1.160E-02  1.096E-02  1.037E-02  9.800E-03
BE 10    3.288E-10  3.288E-10  3.288E-10  3.288E-10  3.288E-10  3.288E-10  3.288E-10  3.288E-10  3.288E-10
C 14     1.326E-08  1.326E-08  1.321E-08  1.321E-08  1.321E-08  1.320E-08  1.320E-08  1.320E-08  1.320E-08
SE 79     6.066E-05  6.067E-05  6.064E-05  6.064E-05  6.064E-05  6.064E-05  6.064E-05  6.064E-05  6.064E-05
KR 81     2.477E-12  2.477E-12  2.476E-12  2.476E-12  2.476E-12  2.476E-12  2.476E-12  2.476E-12  2.476E-12
KR 85     1.426E+00  1.338E+00  1.584E-01  1.485E-01  1.392E-01  1.305E-01  1.223E-01  1.147E-01  1.075E-01
RB 86     1.004E+00  1.284E-06  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
RB 87     3.035E-09  3.036E-09  3.036E-09  3.036E-09  3.036E-09  3.036E-09  3.036E-09  3.036E-09  3.036E-09
SR 89     3.908E+02  2.598E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
SR 90     1.053E+01  1.029E+01  4.690E+00  4.580E+00  4.472E+00  4.367E+00  4.264E+00  4.164E+00  4.066E+00
Y 90      1.101E+01  1.029E+01  4.691E+00  4.581E+00  4.473E+00  4.368E+00  4.265E+00  4.165E+00  4.067E+00
Y 91      4.788E+02  6.367E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
NB 92     1.462E-10  2.203E-21  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00  0.000E+00
ZR 93     2.359E-04  2.363E-04  2.363E-04  2.363E-04  2.363E-04  2.363E-04  2.363E-04  2.363E-04  2.363E-04
NB 93M   5.360E-06  1.625E-05  1.857E-04  1.877E-04  1.895E-04  1.912E-04  1.929E-04  1.944E-04  1.959E-04

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## Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory of ICPP Fuels as a Function of Decay Time (Continued)

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sbwss5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:40
      345.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

NB 94    2.350E-09 2.350E-09 2.347E-09 2.347E-09 2.347E-09 2.347E-09 2.347E-09 2.347E-09 2.347E-09
ZR 95    5.416E+02 1.036E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95    5.255E+02 2.329E+01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
NB 95M   3.932E+00 7.683E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TC 98    9.251E-10 9.251E-10 9.251E-10 9.251E-10 9.251E-10 9.251E-10 9.251E-10 9.251E-10 9.251E-10
TC 99    1.517E-03 1.536E-03 1.536E-03 1.536E-03 1.536E-03 1.536E-03 1.536E-03 1.536E-03 1.536E-03
RH102   2.066E-04 1.627E-04 6.107E-08 4.809E-08 3.786E-08 2.981E-08 2.348E-08 1.848E-08 1.456E-08
RU103   3.036E+02 4.839E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RH103M  2.736E+02 4.362E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
RU106   3.029E+01 1.523E+01 2.125E-09 1.069E-09 5.372E-10 2.701E-10 1.358E-10 6.827E-11 3.432E-11
RH106   3.031E+01 1.523E+01 2.125E-09 1.069E-09 5.372E-10 2.701E-10 1.358E-10 6.827E-11 3.432E-11
AG106   3.703E-11 4.297E-24 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PD107   4.168E-06 4.168E-06 4.168E-06 4.168E-06 4.168E-06 4.168E-06 4.168E-06 4.168E-06 4.168E-06
AG108   3.729E-04 1.214E-11 1.014E-11 1.008E-11 1.003E-11 9.975E-12 9.921E-12 9.867E-12 9.813E-12
AG108M  1.372E-10 1.364E-10 1.139E-10 1.133E-10 1.127E-10 1.121E-10 1.115E-10 1.109E-10 1.103E-10
AG109M  1.975E+01 1.747E-07 2.646E-15 1.533E-15 8.885E-16 5.149E-16 2.984E-16 1.729E-16 1.002E-16
CD109   3.015E-07 1.747E-07 2.646E-15 1.533E-15 8.885E-16 5.149E-16 2.984E-16 1.729E-16 1.002E-16
AG110   5.202E-01 1.959E-04 5.913E-19 2.148E-19 7.798E-20 2.880E-20 1.068E-20 3.876E-21 1.744E-21
AG110M  4.057E-02 1.473E-02 4.446E-17 1.615E-17 5.842E-18 2.166E-18 8.027E-19 2.623E-19 1.312E-19
AG111   1.117E+01 1.955E-14 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD113M  6.960E-03 6.641E-03 1.385E-03 1.320E-03 1.259E-03 1.201E-03 1.145E-03 1.092E-03 1.041E-03
IN114   1.634E-04 2.272E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN114M  3.945E-05 2.374E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CD115M  7.893E-01 2.703E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
IN115   9.704E-15 1.000E-14 1.000E-14 1.000E-14 1.000E-14 1.000E-14 1.000E-14 1.000E-14 1.000E-14
IN115M  8.176E+00 1.900E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN117M  9.140E-04 1.288E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN119M  8.028E-02 4.857E-02 4.441E-17 1.581E-17 5.604E-18 1.986E-18 7.233E-19 2.291E-19 1.147E-19
SN121M  5.181E-05 5.110E-05 3.233E-05 3.188E-05 3.144E-05 3.101E-05 3.058E-05 3.016E-05 2.975E-05
SN123   1.745E+00 2.457E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE123   4.896E-17 5.302E-17 5.357E-17 5.357E-17 5.357E-17 5.357E-17 5.357E-17 5.357E-17 5.357E-17
TE123M  1.408E-04 1.697E-05 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB124   1.122E-01 1.673E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SN125   4.297E+00 1.689E-11 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SB125   2.932E+00 2.315E+00 6.000E-04 4.672E-04 3.638E-04 2.832E-04 2.205E-04 1.717E-04 1.337E-04
TE125M  5.227E-01 5.624E-01 1.464E-C4 1.140E-04 8.875E-05 6.910E-05 5.380E-05 4.189E-05 3.262E-05
SN126   1.337E-04 1.337E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04
SB126   5.216E-01 1.872E-05 1.871E-05 1.871E-05 1.871E-05 1.871E-05 1.871E-05 1.871E-05 1.871E-05
SB126M  2.608E-01 1.337E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04 1.336E-04
TE127   3.623E+01 4.512E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE127M  4.509E-01 4.606E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE127   6.714E-06 6.417E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129   9.539E+01 4.958E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TE129M  1.420E+01 7.617E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I129    4.078E-06 4.164E-06 4.164E-06 4.164E-06 4.164E-06 4.164E-06 4.164E-06 4.164E-06 4.164E-06
XE129M  3.352E-05 6.046E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
I131    2.883E+02 6.260E-12 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE131M  3.219E+00 5.774E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS132   1.705E-02 1.777E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
XE133   5.565E+02 7.500E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS134   2.331E+00 1.665E+02 5.534E-05 1.810E-05 1.293E-05 9.242E-06 6.603E-06 4.718E-06 3.371E-05
CS135   1.586E-04 1.590E-04 1.590E-C4 1.590E-04 1.590E-04 1.590E-04 1.590E-04 1.590E-04 1.590E-04
CS136   4.460E+00 1.808E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
BA136M  7.350E-01 2.980E-09 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CS137   1.147E+01 1.212E+01 5.230E+00 5.111E+00 4.994E+00 4.880E+00 4.768E+00 4.659E+00 4.553E+00
BA137M  1.089E+01 1.061E+01 4.948E+00 4.835E+00 4.724E+00 4.616E+00 4.511E+00 4.408E+00 4.307E+00
LA138   1.446E-14 1.446E-14 1.446E-14 1.446E-14 1.446E-14 1.446E-14 1.446E-14 1.446E-14 1.446E-14
BA140   5.218E+02 1.320E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
LA140   5.306E+02 5.519E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE141   5.204E+02 2.172E-01 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE142   3.041E-09 3.042E-09 3.042E-09 3.042E-09 3.042E-09 3.042E-09 3.042E-09 3.042E-09 3.042E-09
PR143   4.784E+02 4.189E-06 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
CE144   2.597E+02 1.066E+02 1.833E-11 7.524E-12 3.088E-12 1.267E-12 5.200E-13 2.134E-13 8.759E-14
PR144   2.602E+02 1.066E+02 1.833E-11 7.524E-12 3.088E-12 1.267E-12 5.201E-13 2.134E-13 8.759E-14
PR144M  3.119E+00 1.279E+00 2.200E-13 9.029E-14 3.705E-14 1.521E-14 6.241E-15 2.561E-15 1.051E-15
ND144   4.745E-14 1.042E-13 1.437E-13 1.437E-13 1.437E-13 1.437E-13 1.437E-13 1.437E-13 1.437E-13
PM146   1.057E-03 9.322E-04 1.457E-05 1.284E-05 1.132E-05 9.980E-06 8.798E-06 7.756E-06 6.838E-06
SM146   1.627E-11 1.991E-11 4.659E-11 4.664E-11 4.668E-11 4.672E-11 4.676E-11 4.679E-11 4.681E-11
ND147   2.076E+02 2.379E-08 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM147   4.088E+01 3.325E+01 5.436E-03 4.174E-03 3.204E-03 2.460E-03 1.889E-03 1.451E-03 1.114E-03
SM147   1.256E-10 3.721E-10 1.187E-09 1.187E-09 1.187E-09 1.187E-09 1.187E-09 1.187E-09 1.187E-09
PM148   1.183E+01 1.574E-03 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
PM148M  1.285E+01 2.792E-02 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
SM148   9.057E-16 1.109E-15 1.109E-15 1.109E-15 1.109E-15 1.109E-15 1.109E-15 1.109E-15 1.109E-15

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

```

sbwss5
ORIGEN2 V2.1 (8-1-91), Run on 11/17/97 at 08:31:40
          345.0D   1.0YR   34.0YR   35.0YR   36.0YR   37.0YR   38.0YR   39.0YR   40.0YR

SM149    6.135E-15 6.196E-15 6.196E-15 6.196E-15 6.196E-15 6.196E-15 6.196E-15 6.196E-15 6.196E-15
EU150    3.583E-08 3.515E-08 1.862E-08 1.826E-08 1.791E-08 1.757E-08 1.724E-08 1.691E-08 1.659E-08
SM151    2.733E-01 2.726E-01 2.114E-01 2.098E-01 2.082E-01 2.066E-01 2.050E-01 2.035E-01 2.019E-01
EU152    4.023E-04 3.823E-04 7.111E-05 6.758E-05 6.422E-05 6.103E-05 5.800E-05 5.512E-05 5.238E-05
GD152    1.946E-17 2.026E-17 3.117E-17 3.130E-17 3.142E-17 3.153E-17 3.163E-17 3.174E-17 3.183E-17
GD153    1.863E-04 6.544E-05 6.658E-20 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
EU154    7.611E-02 7.021E-02 4.913E-03 4.532E-03 4.181E-03 3.858E-03 3.559E-03 3.283E-03 3.029E-03
EU155    6.283E-01 5.464E-01 5.425E-03 4.717E-03 4.102E-03 3.567E-03 3.102E-03 2.697E-03 2.345E-03
EU156    3.188E+00 1.871E-07 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB160    1.835E-02 5.534E-04 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TB161    8.877E-02 1.148E-17 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
HO166M   7.785E-09 7.781E-09 7.634E-09 7.629E-09 7.625E-09 7.621E-09 7.616E-09 7.612E-09 7.607E-09
ER169    2.099E-07 4.218E-19 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM170    3.205E-09 4.475E-10 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00 0.000E+00
TM171    4.776E-12 3.328E-12 2.230E-17 1.553E-17 1.081E-17 7.527E-18 5.241E-18 3.650E-18 2.541E-18

```

**Attachment C: ORIGEN2 Input and Output for Calculating the Radionuclide Inventory  
of ICPP Fuels as a Function of Decay Time (Continued)**

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# **Attachment D**

## Attachment D: Source Listing for FORTRAN Program REDUCE1

```
PROGRAM REDUCE1
C
C----- WRITTEN BY D.R. WENZEL
C
C           TO REDUCE ORIGEN2 OUTPUT
C
CHARACTER * 1 ORGLINE(132), DCYTME(9)
CHARACTER * 3 PBRK, PBREAK
CHARACTER * 5 SUM, TOTAL
CHARACTER * 7 BEGIN, START
CHARACTER * 9 RUN
CHARACTER * 12 DESC
CHARACTER * 132 BUFFER
C
EQUIVALENCE (DCYTME,ORGLINE(23)), (PBRK,ORGLINE(1)),
+             (SUM,ORGLINE(2)), (BEGIN,ORGLINE(23))
C
DATA PBREAK /'1  '/
DATA TOTAL /'TOTAL'/
DATA START /'7 NUCLID'/
C
C----- DETERMINE RUN NAME
C
CALL GETCL(RUN)
C
C----- OPEN INPUT AND OUTPUT FILES
C
OPEN(3,FILE ='REDUCE.IN', STATUS='OLD', FORM='FORMATTED',
+      ERR = 900)
OPEN(6,FILE ='REDUCE.OUT', STATUS='UNKNOWN', ERR = 920)
+
C
PRINT *, 'Working -- have patience.'
C
IFLAG = 0
WRITE(6,600) RUN
600 FORMAT(A9)
READ(3,300) ORGLINE
300 FORMAT(132A1)
READ(3,300) ORGLINE
WRITE(6,300) ORGLINE
C
C----- SEARCH FOR BEGINNING OF DESIRED DATA
C
30 READ(3,300,END=999) ORGLINE
IF(BEGIN .NE. START) GO TO 30
C
C----- BEGIN SEARCHING FOR SELECTED RADIONUCLIDES
C
READ(3,300,END=999) ORGLINE
READ(3,300,END=999) ORGLINE
IF(IFLAG .EQ. 0) THEN
WRITE(6,300) ORGLINE
C
WRITE(6,310) DCYTME
C 310      FORMAT(16X,9A1)
IFLAG = 1
```

### Attachment C: Source Listing for FORTRAN Program REDUCE1 (Continued)

```
        ENDIF
C
40   READ(3,300,END=999) ORGLINE
     IF(PBRK .EQ. PBREAK) GO TO 50
     IF(SUM .EQ. TOTAL) GO TO 60
     WRITE(BUFFER,300) ORGLINE
     READ(BUFFER,400) DESC, VALUE
400  FORMAT(A12,10X,E9.4)
     IF(VALUE .LE. 0.) GO TO 40
     WRITE(6,300) ORGLINE
     GO TO 40
C
C----- SKIP LINES OF PAGE BREAK
C
50   DO 55 I=1,8
     READ(3,300,END=999) ORGLINE
55   CONTINUE
C
     GO TO 40
C
C----- WRITE BLANK LINE FOLLOWING A TOTAL AND THEN SEARCH FOR
C           MORE OUTPUT
C
60   WRITE(6,420)
420  FORMAT(' ')
     GO TO 30
C
C----- ERROR STATEMENTS
C
900  WRITE(6,9000)
9000 FORMAT(2X,'ERROR IN OPENING FILE 3')
     GO TO 999
C
920  WRITE(6,9020)
9020 FORMAT(2X,'ERROR IN OPENING FILE 6')
     GO TO 999
C
C----- PROGRAM END
C
999  CONTINUE
END
```

# **Attachment E**

## Attachment E: Output from FORTRAN Program REDUCE97

reduce97.out

Nuclide	Calculated mCi/L	Normalized to Cs-137
TL207	3.686E-08	5.30E-10
TL208	4.375E-06	6.29E-08
TL209	4.483E-12	6.44E-14
PB209	2.076E-10	2.98E-12
PB210	2.456E-09	3.53E-11
PB211	3.697E-08	5.31E-10
PB212	1.218E-05	1.75E-07
PB214	7.957E-09	1.14E-10
BI210M	2.723E-22	3.91E-24
BI210	2.457E-09	3.53E-11
BI211	3.697E-08	5.31E-10
BI212	1.218E-05	1.75E-07
BI213	2.076E-10	2.98E-12
BI214	7.957E-09	1.14E-10
PO210	2.338E-09	3.36E-11
PO211	1.035E-10	1.49E-12
PO212	7.800E-06	1.12E-07
PO213	2.031E-10	2.92E-12
PO214	7.956E-09	1.14E-10
PO215	3.697E-08	5.31E-10
PO216	1.218E-05	1.75E-07
PO218	7.959E-09	1.14E-10
AT217	2.076E-10	2.98E-12
RN219	3.697E-08	5.31E-10
RN220	1.218E-05	1.75E-07
RN222	7.959E-09	1.14E-10
FR221	2.076E-10	2.98E-12
FR223	5.090E-10	7.31E-12
RA223	3.697E-08	5.31E-10
RA224	1.218E-05	1.75E-07
RA225	2.076E-10	2.98E-12
RA226	7.959E-09	1.14E-10
RA228	5.991E-13	8.61E-15
AC225	2.076E-10	2.98E-12
AC227	3.689E-08	5.30E-10
AC228	5.991E-13	8.61E-15
TH227	3.646E-08	5.24E-10
TH228	1.213E-05	1.74E-07
TH229	2.076E-10	2.98E-12
TH230	9.718E-07	1.40E-08
TH231	1.389E-04	2.00E-06
TH232	8.657E-13	1.24E-14
TH234	4.604E-06	6.61E-08
PA231	9.481E-08	1.36E-09
PA233	3.657E-04	5.25E-06
PA234M	4.604E-06	6.61E-08
PA234	5.984E-09	8.60E-11
U232	1.197E-05	1.72E-07
U233	7.898E-08	1.13E-09
U234	3.041E-03	4.37E-05
U235	1.389E-04	2.00E-06
U236	6.002E-04	8.62E-06
U237	4.558E-06	6.55E-08

**Attachment E: Output from FORTRAN Program REDUCE97 (Continued)**

**reduce97.out**

Nuclide	Calculated mCi/L	Normalized to Cs-137
U238	4.604E-06	6.61E-08
U240	2.719E-13	3.91E-15
NP235	3.264E-11	4.69E-13
NP237	3.657E-04	5.25E-06
NP238	3.783E-08	5.44E-10
NP239	1.043E-05	1.50E-07
PU236	1.887E-06	2.71E-08
PU238	1.040E+00	1.49E-02
PU239	1.862E-02	2.68E-04
PU240	3.893E-03	5.59E-05
PU241	1.858E-01	2.67E-03
PU242	3.051E-06	4.38E-08
PU243	1.155E-15	1.66E-17
PU244	2.722E-13	3.91E-15
AM241	2.342E-02	3.37E-04
AM242M	7.566E-06	1.09E-07
AM242	7.529E-06	1.08E-07
AM243	1.043E-05	1.50E-07
CM242	6.235E-06	8.96E-08
CM243	1.713E-06	2.46E-08
CM244	1.141E-04	1.64E-06
CM245	1.592E-08	2.29E-10
CM246	1.045E-09	1.50E-11
CM247	1.155E-15	1.66E-17
CM248	1.219E-15	1.75E-17
CF249	7.012E-15	1.01E-16
CF250	7.437E-15	1.07E-16
CF251	1.093E-16	1.57E-18
CF252	5.674E-17	8.15E-19
H 3	1.312E-01	1.89E-03
BE 10	3.705E-09	5.32E-11
C 14	1.485E-07	2.13E-09
SE 79	5.396E-04	7.75E-06
RB 87	3.594E-08	5.16E-10
SR 90	6.565E+01	9.43E-01
Y 90	6.567E+01	9.44E-01
ZR 93	2.751E-03	3.95E-05
NB 93M	1.966E-03	2.82E-05
NB 94	1.410E-03	2.03E-05
TC 98	3.192E-09	4.59E-11
TC 99	1.740E-02	2.50E-04
RH102	3.588E-06	5.16E-08
RU106	2.997E-04	4.31E-06
RH106	2.997E-04	4.31E-06
PD107	2.042E-05	2.93E-07
AG108	4.825E-11	6.93E-13
AG108M	5.421E-10	7.79E-12
AG109M	2.522E-12	3.62E-14
CD109	2.522E-12	3.62E-14
AG110	6.972E-11	1.00E-12
AG110M	5.242E-09	7.53E-11
CD113M	5.613E-03	8.06E-05
IN115	1.221E-14	1.75E-16

## Attachment E: Output from FORTRAN Program REDUCE97 (Continued)

reduce97.out

Nuclide	Calculated mCi/L	Normalized to Cs-137
SN119M	9.854E-10	1.42E-11
SN121M	8.888E-05	1.28E-06
TE123	4.748E-16	6.82E-18
SB125	3.181E-02	4.57E-04
TE125M	7.760E-03	1.11E-04
SN126	5.081E-04	7.30E-06
SB126	7.114E-05	1.02E-06
SB126M	5.081E-04	7.30E-06
I129	2.956E-05	4.25E-07
CS134	1.421E-01	2.04E-03
CS135	7.234E-04	1.04E-05
CS137	6.960E+01	1.00E+00
BA137M	6.584E+01	9.46E-01
LA138	2.357E-13	3.39E-15
CE142	3.679E-08	5.29E-10
CE144	1.599E-04	2.30E-06
PR144	1.599E-04	2.30E-06
PR144M	1.918E-06	2.76E-08
ND144	1.993E-12	2.86E-14
PM146	1.186E-04	1.70E-06
SM146	2.308E-10	3.32E-12
PM147	8.060E-01	1.16E-02
SM147	9.098E-09	1.31E-10
SM148	4.677E-14	6.72E-16
SM149	4.153E-15	5.97E-17
EU150	1.959E-08	2.81E-10
SM151	4.320E-01	6.21E-03
EU152	4.031E-03	5.79E-05
GD152	1.726E-15	2.48E-17
GD153	1.870E-10	2.69E-12
EU154	7.773E-01	1.12E-02
EU155	1.345E-01	1.93E-03
HO166M	5.709E-08	8.20E-10
TM171	3.890E-12	5.59E-14
CO 60	1.521E-07	2.19E-09

**Attachment E: Output from FORTRAN Program REDUCE97 (Continued)**

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# **Attachment F**

## Attachment G: Adjustments made to Calculated Radionuclide Inventories

`reduce97.tmp`

Nuclide	Weighted			
	Calculated mCi/L	Average mCi/L	Correction Factor	Comments
TL207	3.686E-08	<.....		
TL208	4.375E-06	.		
TL209	4.483E-12	.		
PB209	2.076E-10	.		
PB210	2.456E-09	.....>		
PB211	3.697E-08	.		
PB212	1.218E-05	.		
PB214	7.957E-09	.		
BI210M	2.723E-22	.		
BI210	2.457E-09	.		
BI211	3.697E-08	.		
BI212	1.218E-05	.		
BI213	2.076E-10	.		
BI214	7.957E-09	.		
PO210	2.338E-09	.		
PO211	1.035E-10	.		
PO212	7.800E-06	.		
PO213	2.031E-10	.		
PO214	7.956E-09	.		
PO215	3.697E-08	.		
PO216	1.218E-05	.		
PO218	7.959E-09	.		
AT217	2.076E-10	.		
RN219	3.697E-08	.		
RN220	1.218E-05	.		
RN222	7.959E-09	.		
FR221	2.076E-10	.		
FR223	5.090E-10	.		
RA223	3.697E-08	.		
RA224	1.218E-05	.		
RA225	2.076E-10	.		
RA226	7.959E-09	.		
RA228	5.991E-13	.		
AC225	2.076E-10	.		
AC227	3.689E-08	.		
AC228	5.991E-13	.		
TH227	3.646E-08	.		
TH228	1.213E-05	.		
TH229	2.076E-10	.		
TH230	9.718E-07	.		
TH231	1.389E-04	.		
TH232	8.657E-13	.		
TH234	4.604E-06	.		
PA231	9.481E-08	.		
PA233	3.657E-04	.		
PA234M	4.604E-06	.		
PA234	5.984E-09	<.....		
U233	7.898E-08	1.477E-08	1.87E-01	based on U-235
U234	3.041E-03	9.954E-04	3.27E-01	
U235	1.389E-04	2.591E-05	1.87E-01	
U236	6.002E-04	4.124E-05	6.87E-02	

## Attachment G: Adjustments made to Calculated Radionuclide Inventories (Continued)

`reduce97.tmp`

Nuclide	Calculated mCi/L	Weighted			Comments
		Average mCi/L	Correction Factor		
U237	4.558E-06	8.523E-07	1.87E-01		based on U-235
U238	4.604E-06	2.558E-05	5.56E+00		
U240	2.719E-13	5.085E-14	1.87E-01		based on U-235
NP235	3.264E-11	3.297E-12	1.01E-01		based on Np-237
NP237	3.657E-04	3.628E-03	1.01E-01		
NP238	3.783E-08	3.821E-09	1.01E-01		based on Np-237
NP239	1.043E-05	1.053E-06	1.01E-01		based on Np-237
PU236	1.887E-06	5.812E-06	3.08E+00		based on Pu average
PU238	1.040E+00	4.859E-01	4.67E-01		
PU239	1.862E-02	6.671E-02	3.58E+00		<... ..> avg = 3.08E+00
PU240	3.893E-03	1.247E-02	3.20E+00		.
PU241	1.858E-01	4.145E-01	2.23E+00		
PU242	3.051E-06	1.008E-05	3.30E+00		<... based on Pu average
PU243	1.155E-15	3.557E-15	3.08E+00		based on Pu average
PU244	2.722E-13	8.384E-13	3.08E+00		based on Pu average
AM241	2.342E-02	5.952E-02	2.54E+00		
AM242M	7.566E-06	1.922E-05	2.54E+00		based on Am-241
AM242	7.529E-06	1.912E-05	2.54E+00		based on Am-241
AM243	1.043E-05	2.649E-05	2.54E+00		based on Am-242
CM242	6.235E-06	1.447E-04	2.32E+01		based on Cm-244
CM243	1.713E-06	3.974E-05	2.32E+01		based on Cm-244
CM244	1.141E-04	2.643E-03	2.32E+01		
CM245	1.592E-08	3.693E-07	2.32E+01		based on Cm-244
CM246	1.045E-09	2.424E-08	2.32E+01		based on Cm-244
CM247	1.155E-15	2.680E-14	2.32E+01		based on Cm-244
CM248	1.219E-15	2.828E-14	2.32E+01		based on Cm-244
CF249	7.012E-15	2.160E-14	3.08E+00		based on Pu average
CF250	7.437E-15	2.291E-14	3.08E+00		based on Pu average
CF251	1.093E-16	3.367E-16	3.08E+00		based on Pu average
CF252	5.674E-17	1.748E-16	3.08E+00		based on Pu average
H 3	1.312E-01	1.821E-02	1.39E-01		
BE 10	3.705E-09				
C 14	1.485E-07				
SE 79	5.396E-04				
RB 87	3.594E-08				
SR 90	6.565E+01	7.181E+01	1.09E+00		
Y 90	6.567E+01	7.181E+01	1.09E+00		
ZR 93	2.751E-03				
NB 93M	1.966E-03				
NB 94	1.410E-03				
TC 98	3.192E-09				
TC 99	1.740E-02	1.239E-02	7.12E-01		
RH102	3.588E-06				
RU106	2.997E-04	3.787E-02	1.26E+02		
RH106	2.997E-04	3.787E-02	1.26E+02		
PD107	2.042E-05				
AG108	4.825E-11				
AG108M	5.421E-10				
AG109M	2.522E-12				
CD109	2.522E-12				
AG110	6.972E-11				

**Attachment G: Adjustments made to Calculated Radionuclide Inventories (Continued)**

reduce97.tmp

Nuclide	Calculated mCi/L	Weighted		
		Average mCi/L	Correction Factor	Comments
AG110M	5.242E-09			
CD113M	5.613E-03			
IN115	1.221E-14			
SN119M	9.854E-10			
SN121M	8.888E-05			
TE123	4.748E-16			
SB125	3.181E-02	5.693E-02	1.79E+00	
TE125M	7.760E-03			
SN126	5.081E-04			
SB126	7.114E-05			
SB126M	5.081E-04			
I129	2.956E-05	1.029E-02	3.48E+02	
CS134	1.421E-01	1.430E-01	1.01E+00	
CS135	7.234E-04	1.063E-03	1.47E+00	
CS137	6.960E+01	7.015E+01	1.01E+00	
BA137M	6.584E+01	6.636E+01	1.01E+00	
LA138	2.357E-13			
CE142	3.679E-08			
CE144	1.599E-04	7.158E-02	4.48E+02	
PR144	1.599E-04	7.158E-02	4.48E+02	
PR144M	1.918E-06			
ND144	1.993E-12			
PM146	1.186E-04			
SM146	2.308E-10			
PM147	8.060E-01			
SM147	9.098E-09			
SM148	4.677E-14			
SM149	4.153E-15			
EU150	1.959E-08			
SM151	4.320E-01			
EU152	4.031E-03			
GD152	1.726E-15			
GD153	1.870E-10			
EU154	7.773E-01	3.010E-01	3.87E-01	
EU155	1.345E-01	4.131E-01	3.07E+00	
HO166M	5.709E-08			
TM171	3.890E-12			
CO 60	1.521E-07	8.787E-02	5.77E+05	
NI 63		3.738E-02		

**Attachment G: Adjustments made to Calculated Radionuclide Inventories (Continued)**

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# **Attachment G**

**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function of Time after 1997**

-1  
-1  
-1

RDA ORIGEN2, VERSION 2.1 (8-1-91)  
 BAS Sodium Bearing Waste (SBW)  
 CUT -1  
 LIP 0 0 0  
 LIB 0 1 2 3 204 908 909 9 50 0 4 0  
 TIT Final Activity in mCi/L rather than Ci  
 PHO 101 102 103 10  
 INP -1 1 -1 -1 1 1  
 MOV -1 1 0 1.0  
 HED 1  
 OPTL 8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
 OPTA 8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
 OPTF 8 8 8 8 5 8 5 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8  
 DEC 18.08 1 2 5 0  
 DEC 37.08 2 3 5 0  
 DEC 118. 3 4 5 0  
 DEC 518. 4 5 5 0  
 DEC 1018. 5 6 5 0  
 OUT -6 1 -1 0  
 OUT 6 1 -1 0  
 END  
 1 270600 7.770E-05 280630 6.590E-04 0 0. 0 0.  
 2 812070 1.930E-16 812080 1.480E-14 812090 1.100E-20 0 0.  
 2 822090 4.500E-17 822100 3.210E-11 822110 1.500E-15 0 0.  
 2 822120 8.760E-12 822140 2.430E-16 832101 4.800E-19 0 0.  
 2 832100 1.980E-14 832120 8.310E-13 832130 1.070E-17 0 0.  
 2 832140 1.800E-16 842100 5.200E-13 842160 3.400E-17 0 0.  
 2 842180 2.810E-17 862200 1.320E-14 862220 5.170E-14 0 0.  
 2 872210 1.170E-18 872230 1.320E-17 882230 7.210E-13 0 0.  
 2 882240 7.560E-11 882250 5.290E-15 882260 8.050E-09 0 0.  
 2 882280 2.200E-15 892250 3.580E-15 892270 5.100E-10 0 0.  
 2 892280 2.670E-19 902270 1.190E-12 902280 1.480E-08 0 0.  
 2 902290 9.760E-10 902300 4.810E-05 902310 2.610E-10 0 0.  
 2 902320 7.890E-06 902340 1.990E-10 912310 2.280E-06 0 0.  
 2 912330 1.760E-08 912341 6.700E-15 912340 2.990E-15 0 0.  
 2 922320 1.050E-07 922330 1.530E-06 922340 1.590E-01 0 0.  
 2 922350 1.200E+01 922360 6.370E-01 922380 7.610E+01 0 0.  
 2 922400 5.490E-20 932350 2.350E-15 932370 5.140E+00 0 0.  
 2 932390 4.540E-12 942360 2.190E-08 942380 2.840E-02 0 0.  
 2 942390 1.080E+00 942400 5.500E-02 942410 4.020E-03 0 0.  
 2 942420 2.560E-03 942430 1.370E-21 942440 4.720E-08 0 0.  
 2 952410 1.730E-02 952421 1.980E-06 952420 2.360E-11 0 0.  
 2 952430 1.330E-04 962420 4.360E-08 962430 7.700E-07 0 0.  
 2 962440 3.270E-05 962450 2.150E-06 962460 7.920E-08 0 0.  
 2 962470 2.890E-10 962480 6.720E-12 982490 5.270E-15 0 0.  
 2 982500 2.090E-16 982510 2.130E-16 982520 3.250E-19 0 0.  
 3 10030 1.880E-06 40100 1.660E-07 60140 3.330E-08 0 0.  
 3 340790 7.750E-03 370870 4.140E-01 380900 5.260E-01 0 0.  
 3 390900 1.320E-04 400930 1.090E+00 410931 6.950E-06 0 0.  
 3 410940 7.520E-03 430980 3.670E-06 430990 7.310E-01 0 0.  
 3 451020 2.970E-09 441060 1.130E-05 451060 1.060E-11 0 0.  
 3 461070 3.970E-02 471080 6.570E-20 471081 2.080E-11 0 0.  
 3 481090 9.760E-16 471100 1.670E-20 471101 1.100E-12 0 0.

**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function  
of Time after 1997 (Continued)**

```
3 481131 2.410E-05 491150 2.000E-02 501191 2.630E-13 0 0.  
3 501211 1.500E-06 521230 1.630E-06 511250 5.510E-05 0 0.  
3 521251 4.310E-07 501260 1.790E-02 511260 8.510E-10 0 0.  
3 511261 6.470E-12 531290 5.830E+01 551340 1.100E-04 0 0.  
3 551350 9.230E-01 551370 8.060E-01 561371 1.230E-07 0 0.  
3 571380 1.230E-05 581420 1.540E+00 581440 2.240E-05 0 0.  
3 591440 9.470E-10 591441 1.060E-14 601440 1.680E+00 0 0.  
3 611460 2.680E-07 621460 9.700E-06 611470 8.690E-04 0 0.  
3 621470 4.000E-01 621480 1.550E-01 621490 1.730E-02 0 0.  
3 631500 2.960E-10 621510 1.640E-02 631520 2.330E-05 0 0.  
3 641520 7.920E-05 641530 5.290E-14 631540 1.110E-03 0 0.  
3 631550 8.880E-04 671661 3.180E-08 691710 3.570E-15 0 0.  
0
```

**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function of Time after 1997 (Continued)**

```
echo off
echo **
echo **                                O R I G E N 2
echo **
copy sbwdecay.INP tape5.inp >nul
REM (NOT USED IN THIS CASE) copy sbwdecay.u3 tape3.inp >nul
copy \origen2\libs\decay.lib+\origen2\libs\atr.lib tape9.inp >nul
copy \origen2\libs\gxuo2brm.lib tape10.inp >nul
\origen2\code\origen2
rem combine and save files from run
copy tape12.out+tape6.out sbwdecay.u6 >nul
copy tape13.out+tapel1.out sbwdecay.u11 >nul
ren tape7.out sbwdecay.pch
ren tape15.out sbwdecay.dbg
ren tape16.out sbwdecay.vxs
ren tape50.out sbwdecay.ech
rem cleanup files
del tape*.inp
del tape*.out
echo ****
echo **** O R I G E N 2 - Version 2.1 ****
echo **** Execution Completed ****
echo ****
echo on
```

**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function  
of Time after 1997 (Continued)**

**sbwdecay**

**ORIGEN2 V2.1 (8-1-91), Run on 11/19/97 at 09:35:01**  
**mCi/L            18.1YR        37.1YR      118.0YR    518.0YR    1018.0YR**

CO 60	8.789E-02	8.149E-03	6.695E-04	1.597E-08	0.000E+00	0.000E+00
NI 63	4.066E-02	3.549E-02	3.075E-02	1.672E-02	8.209E-04	1.898E-05
TL206	0.000E+00	2.714E-22	2.714E-22	2.714E-22	2.713E-22	
TL207	3.677E-08	7.013E-08	9.419E-08	1.534E-07	3.886E-07	6.574E-07
TL208	4.360E-06	8.452E-07	7.046E-07	3.233E-07	6.874E-09	5.685E-11
TL209	4.500E-12	1.028E-11	2.774E-11	2.321E-10	4.288E-09	1.626E-08
PB209	2.046E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
PB210	2.452E-09	6.689E-09	1.326E-08	5.975E-08	7.369E-07	2.326E-06
PB211	3.704E-08	7.032E-08	9.445E-08	1.538E-07	3.897E-07	6.593E-07
PB212	1.218E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
PB214	7.970E-09	1.611E-08	2.600E-08	8.362E-08	7.370E-07	2.327E-06
BI210M	2.725E-22	2.725E-22	2.725E-22	2.725E-22	2.724E-22	
BI210	2.458E-09	6.690E-09	1.326E-08	5.975E-08	7.369E-07	2.326E-06
BI211	0.000E+00	7.032E-08	9.445E-08	1.538E-07	3.897E-07	6.593E-07
BI212	1.218E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
BI213	2.070E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
BI214	7.951E-09	1.611E-08	2.600E-08	8.362E-08	7.370E-07	2.327E-06
PO210	2.337E-09	6.690E-09	1.326E-08	5.975E-08	7.369E-07	2.326E-06
PO211	0.000E+00	1.969E-10	2.645E-10	4.307E-10	1.091E-09	1.846E-09
PO212	0.000E+00	1.507E-06	1.257E-06	5.766E-07	1.226E-08	1.014E-10
PO213	0.000E+00	4.657E-10	1.257E-09	1.051E-08	1.942E-07	7.366E-07
PO214	0.000E+00	1.611E-08	2.599E-08	8.360E-08	7.369E-07	2.326E-06
PO215	0.000E+00	7.032E-08	9.445E-08	1.538E-07	3.897E-07	6.593E-07
PO216	1.184E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
PO218	7.950E-09	1.612E-08	2.600E-08	8.364E-08	7.372E-07	2.327E-06
AT217	0.000E+00	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
RN219	0.000E+00	7.032E-08	9.445E-08	1.538E-07	3.897E-07	6.593E-07
RN220	1.218E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
RN222	7.955E-09	1.612E-08	2.600E-08	8.364E-08	7.372E-07	2.327E-06
FR221	2.075E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
FR223	5.108E-10	9.698E-10	1.302E-09	2.122E-09	5.378E-09	9.098E-09
RA223	3.694E-08	7.032E-08	9.445E-08	1.538E-07	3.897E-07	6.593E-07
RA224	1.205E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
RA225	2.075E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
RA226	7.962E-09	1.612E-08	2.600E-08	8.364E-08	7.372E-07	2.327E-06
RA228	5.151E-13	8.318E-13	9.143E-13	1.106E-12	1.922E-12	2.945E-12
AC225	2.078E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
AC227	3.690E-08	7.028E-08	9.436E-08	1.538E-07	3.897E-07	6.593E-07
AC228	5.989E-13	8.318E-13	9.143E-13	1.106E-12	1.922E-12	2.945E-12
TH227	3.659E-08	6.935E-08	9.315E-08	1.517E-07	3.843E-07	6.502E-07
TH228	1.214E-05	2.352E-06	1.961E-06	8.999E-07	1.913E-08	1.582E-10
TH229	2.077E-10	4.760E-10	1.284E-09	1.075E-08	1.985E-07	7.529E-07
TH230	9.713E-07	1.135E-06	1.310E-06	2.090E-06	6.204E-06	1.141E-05
TH231	1.388E-04	2.595E-05	2.595E-05	2.596E-05	2.598E-05	2.602E-05
TH232	8.657E-13	9.024E-13	9.411E-13	1.106E-12	1.922E-12	2.945E-12
TH234	4.610E-06	2.559E-05	2.559E-05	2.559E-05	2.559E-05	2.559E-05
PA231	1.077E-07	1.176E-07	1.280E-07	1.722E-07	3.896E-07	6.590E-07
PA233	3.654E-04	3.625E-03	3.625E-03	3.627E-03	3.632E-03	3.635E-03
PA234M	4.603E-06	2.559E-05	2.559E-05	2.559E-05	2.559E-05	2.559E-05

**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function of Time after 1997 (Continued)**

```

sbwdecay
ORIGEN2 V2.1 (8-1-91), Run on 11/19/97 at 09:35:01
mCi/L      18.1YR    37.1YR   118.0YR   518.0YR   1018.0YR

PA234      5.979E-09 3.327E-08 3.327E-08 3.327E-08 3.327E-08
U232      2.248E-06 2.286E-06 1.909E-06 8.760E-07 1.862E-08 1.512E-10
U233      1.482E-08 2.999E-07 6.011E-07 1.884E-06 8.225E-06 1.614E-05
U234      9.939E-04 1.017E-03 1.038E-03 1.099E-03 1.164E-03 1.165E-03
U235      2.595E-05 2.595E-05 2.595E-05 2.596E-05 2.598E-05 2.602E-05
U236      4.123E-05 4.124E-05 4.124E-05 4.127E-05 4.142E-05 4.159E-05
U237      0.000E+00 4.257E-06 1.706E-06 3.469E-08 8.688E-12 8.341E-12
U238      2.559E-05 2.559E-05 2.559E-05 2.559E-05 2.559E-05 2.559E-05
U240      5.086E-14 8.364E-13 8.364E-13 8.364E-13 8.364E-13 8.364E-13
NP235      3.298E-12 3.156E-17 1.677E-22 0.000E+00 0.000E+00 0.000E+00
NP237      3.625E-03 3.625E-03 3.625E-03 3.627E-03 3.632E-03 3.635E-03
NP238      0.000E+00 8.864E-08 8.128E-08 5.620E-08 9.070E-09 9.277E-10
NP239      1.054E-06 2.648E-05 2.643E-05 2.623E-05 2.526E-05 2.411E-05
NP240M     0.000E+00 8.364E-13 8.364E-13 8.364E-13 8.364E-13 8.364E-13
PU236      1.164E-05 1.435E-07 1.415E-09 4.042E-18 0.000E+00 0.000E+00
PU238      4.864E-01 4.217E-01 3.629E-01 1.915E-01 8.128E-03 1.568E-04
PU239      6.716E-02 6.713E-02 6.709E-02 6.693E-02 6.617E-02 6.522E-02
PU240      1.254E-02 1.252E-02 1.249E-02 1.239E-02 1.187E-02 1.126E-02
PU241      4.143E-01 1.735E-01 6.952E-02 1.414E-03 3.546E-07 3.404E-07
PU242      9.778E-06 9.778E-06 9.778E-06 9.777E-06 9.771E-06 9.762E-06
PU243      3.567E-15 2.682E-14 2.682E-14 2.682E-14 2.682E-14 2.682E-14
PU244      8.375E-13 8.375E-13 8.375E-13 8.375E-13 8.375E-13 8.375E-13
AM241      5.940E-02 6.559E-02 6.703E-02 6.093E-02 3.210E-02 1.440E-02
AM242M     1.925E-05 1.773E-05 1.626E-05 1.124E-05 1.814E-06 1.855E-07
AM242      1.909E-05 1.764E-05 1.617E-05 1.118E-05 1.805E-06 1.846E-07
AM243      2.652E-05 2.648E-05 2.643E-05 2.623E-05 2.526E-05 2.411E-05
CM242      1.442E-04 1.459E-05 1.338E-05 9.249E-06 1.493E-06 1.527E-07
CM243      3.976E-05 2.562E-05 1.614E-05 2.255E-06 1.343E-10 7.031E-16
CM244      2.647E-03 1.325E-03 6.402E-04 2.892E-05 6.490E-12 3.169E-20
CM245      3.693E-07 3.688E-07 3.682E-07 3.658E-07 3.540E-07 3.399E-07
CM246      2.434E-08 2.427E-08 2.421E-08 2.392E-08 2.256E-08 2.097E-08
CM247      2.682E-14 2.682E-14 2.682E-14 2.682E-14 2.682E-14 2.682E-14
CM248      2.858E-14 2.858E-14 2.858E-14 2.858E-14 2.855E-14 2.852E-14
CF249      2.160E-14 2.084E-14 2.007E-14 1.710E-14 7.753E-15 2.884E-15
CF250      2.286E-14 8.769E-15 3.204E-15 4.400E-17 2.743E-26 8.548E-38
CF251      3.380E-16 3.333E-16 3.284E-16 3.085E-16 2.266E-16 1.540E-16
CF252      1.748E-16 1.520E-18 1.988E-21 1.160E-30 0.000E+00 0.000E+00

H 3        1.815E-02 6.578E-03 2.264E-03 2.412E-05 4.281E-15 2.773E-27
BE 10      3.711E-09 3.711E-09 3.711E-09 3.711E-09 3.710E-09 3.709E-09
C 14        1.485E-07 1.482E-07 1.478E-07 1.464E-07 1.395E-07 1.313E-07
SE 79        5.401E-04 5.400E-04 5.399E-04 5.394E-04 5.371E-04 5.343E-04
RB 87        3.624E-08 3.624E-08 3.624E-08 3.624E-08 3.624E-08 3.624E-08
SR 90        7.178E+01 4.668E+01 2.970E+01 4.327E+00 3.172E-04 2.152E-09
Y 90        7.185E+01 4.669E+01 2.970E+01 4.328E+00 3.173E-04 2.152E-09
ZR 93        2.740E-03 2.740E-03 2.740E-03 2.740E-03 2.739E-03 2.739E-03
NB 93M       1.965E-03 2.349E-03 2.507E-03 2.601E-03 2.602E-03 2.602E-03
NB 94        1.409E-03 1.409E-03 1.408E-03 1.404E-03 1.385E-03 1.361E-03
TC 98        3.190E-09 3.190E-09 3.190E-09 3.190E-09 3.190E-09 3.189E-09
TC 99        1.240E-02 1.240E-02 1.240E-02 1.239E-02 1.238E-02 1.236E-02

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**Attachment F: Input and Output for ORIGEN2 Run Decaying SBW activity as a Function of Time after 1997 (Continued)**

**sbwdecay**

**ORIGEN2 V2.1 (8-1-91), Run on 11/19/97 at 09:35:01**

	<b>mCi/L</b>	<b>18.1YR</b>	<b>37.1YR</b>	<b>118.0YR</b>	<b>518.0YR</b>	<b>1018.0YR</b>
--	--------------	---------------	---------------	----------------	----------------	-----------------

RH102	3.591E-06	4.769E-08	5.084E-10	2.025E-18	0.000E+00	0.000E+00
RU106	3.782E-02	1.508E-07	3.193E-13	0.000E+00	0.000E+00	0.000E+00
RH106	3.775E-02	1.508E-07	3.193E-13	0.000E+00	0.000E+00	0.000E+00
PD107	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05	2.043E-05
AG108	4.828E-11	4.373E-11	3.943E-11	2.535E-11	2.857E-12	1.865E-13
AG108M	5.423E-10	4.914E-10	4.430E-10	2.848E-10	3.210E-11	2.096E-12
AG109M	0.000E+00	1.310E-16	4.121E-21	0.000E+00	0.000E+00	0.000E+00
CD109	2.521E-12	1.310E-16	4.121E-21	3.945E-40	0.000E+00	0.000E+00
AG110	6.965E-11	7.706E-19	3.362E-27	0.000E+00	0.000E+00	0.000E+00
AG110M	5.228E-09	5.794E-17	2.528E-25	0.000E+00	0.000E+00	0.000E+00
CD113M	5.228E-03	2.215E-03	8.980E-04	1.921E-05	1.072E-13	5.166E-24
IN115	1.245E-13	1.245E-13	1.245E-13	1.245E-13	1.245E-13	1.245E-13
SN119M	1.178E-09	9.080E-18	2.704E-26	0.000E+00	0.000E+00	0.000E+00
SN121M	8.872E-05	6.904E-05	5.305E-05	1.727E-05	6.726E-08	6.543E-11
TE123	4.739E-16	4.739E-16	4.739E-16	4.739E-16	4.739E-16	4.739E-16
SB125	5.692E-02	6.170E-04	5.313E-06	8.529E-15	0.000E+00	0.000E+00
TE125M	7.766E-03	1.505E-04	1.296E-06	2.081E-15	0.000E+00	0.000E+00
SN126	5.080E-04	5.080E-04	5.079E-04	5.076E-04	5.062E-04	5.045E-04
SB126	7.118E-05	7.112E-05	7.111E-05	7.107E-05	7.087E-05	7.063E-05
SB126M	5.084E-04	5.080E-04	5.079E-04	5.076E-04	5.062E-04	5.045E-04
I129	1.030E-02	1.030E-02	1.030E-02	1.030E-02	1.030E-02	1.030E-02
CS134	1.424E-01	3.261E-04	5.492E-07	8.433E-19	0.000E+00	0.000E+00
CS135	1.063E-03	1.063E-03	1.063E-03	1.063E-03	1.063E-03	1.063E-03
CS137	7.014E+01	4.619E+01	2.978E+01	4.591E+00	4.447E-04	4.273E-09
BA137M	6.619E+01	4.369E+01	2.817E+01	4.343E+00	4.206E-04	4.042E-09
LA138	2.361E-13	2.361E-13	2.361E-13	2.361E-13	2.361E-13	2.361E-13
CE142	3.697E-08	3.697E-08	3.697E-08	3.697E-08	3.697E-08	3.697E-08
CE144	7.149E-02	7.259E-09	3.249E-16	0.000E+00	0.000E+00	0.000E+00
PR144	7.158E-02	7.259E-09	3.249E-16	0.000E+00	0.000E+00	0.000E+00
PR144M	1.923E-06	8.711E-11	3.898E-18	0.000E+00	0.000E+00	0.000E+00
ND144	1.988E-12	1.988E-12	1.988E-12	1.988E-12	1.988E-12	1.988E-12
PM146	1.194E-04	1.223E-05	1.115E-06	4.153E-11	0.000E+00	0.000E+00
SM146	3.395E-10	3.426E-10	3.429E-10	3.429E-10	3.429E-10	3.429E-10
PM147	8.059E-01	6.787E-03	4.483E-05	2.325E-14	0.000E+00	0.000E+00
SM147	9.094E-09	9.114E-09	9.114E-09	9.114E-09	9.114E-09	9.114E-09
SM148	4.681E-14	4.681E-14	4.681E-14	4.681E-14	4.681E-14	4.681E-14
SM149	4.155E-15	4.155E-15	4.155E-15	4.155E-15	4.155E-15	4.155E-15
EU150	1.960E-08	1.384E-08	9.600E-09	2.021E-09	9.138E-13	6.024E-17
SM151	4.316E-01	3.755E-01	3.244E-01	1.739E-01	7.987E-03	1.698E-04
EU152	4.031E-03	1.604E-03	6.091E-04	9.855E-06	1.381E-14	1.184E-25
GD152	1.726E-15	1.811E-15	1.846E-15	1.867E-15	1.867E-15	1.867E-15
GD153	1.866E-10	1.140E-18	2.660E-27	0.000E+00	0.000E+00	0.000E+00
EU154	2.997E-01	6.981E-02	1.510E-02	2.215E-05	2.209E-19	6.963E-37
EU155	4.132E-01	3.301E-02	2.319E-03	2.840E-08	0.000E+00	0.000E+00
HO166M	5.709E-08	5.650E-08	5.588E-08	5.333E-08	4.233E-08	3.171E-08
TM171	3.889E-12	5.674E-15	5.960E-18	1.225E-30	0.000E+00	0.000E+00